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Forest Service

Intermountain
Research Station

General Technical
Report INT-277

May 1991



Vascular Plants of West-Central Montana— Identification Guidebook

Klaus Lackschewitz

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THE AUTHOR

KLAUS LACKSCHEWITZ is a volunteer botanist at the Intermountain Research Station in Missoula, MT, and is retired from the University of Montana's Department of Botany. Mr. Lackschewitz is of Baltic German origin. He emigrated to the United States in 1952, coming to Missoula in 1960. After having been involved in horticulture, he began field investigation of the flora of west-central Montana in 1964. He has studied this region intensively since then and has contributed over 11,500 specimens to the Herbarium of the University of Montana (MONTU). In the course of his investigation, he has found several new taxa in western Montana.

ACKNOWLEDGMENTS

Many individuals aided in developing this report. Jaculyn Cory made available her extensive collections, including the new species *Arabis fecunda*. Tor Fageraas aided in the botanical exploration and collection. John Pierce allowed us to incorporate his extensive collections from the Rattlesnake drainage. Wally Albert provided many first collections. Judy Hoy reported on a refugium for rare dryland species, especially grasses. Ken McBride, Bitterroot National Forest, and Steve Shelly, Montana Natural Heritage Program, refined the distributions of several rare species—two of which were first found by Shelly. From its inception this project was supported by the

staff and faculty of the University of Montana's Department of Botany, including Herbarium (MONTU) curators L. H. Harvey, Sherman Preece, and Kathleen Peterson. Botanical authorities at the New York Botanical Garden and at several universities provided identifications of difficult taxa. Peter Stickney, curator of the Intermountain Research Station's Herbarium in Missoula (MRC) provided helpful suggestions for the development of this publication.

Botanist Peter Lesica and ecologist Stephen Cooper carried out the large task of technical editing. They constructed the keys, assembled the illustrations, and thus helped develop a uniquely comprehensive flora understandable to nonbotanists. Funding for editing was provided by the Range, Air, Watershed, and Ecology Program, Northern Region, USDA Forest Service, with technical guidance by Angela Evenden. The Intermountain Research Station's Fire Effects Unit managed the development of this publication; ecologist Ann Bradley provided technical advice, Jan Bixler edited the species descriptions and keys, and Jim Menakis prepared the final copy for the descriptions, keys, and illustrations.

The University of Washington Press generously granted permission to reproduce the drawings from Hitchcock and others (1955-69) to illustrate species. The cover illustration of the bitterroot (*Lewisia rediviva*), first described from our area by explorers Lewis and Clark, was donated by artist Deborah McNeil, Yaak, MT.

FOREWORD

Several years ago the opportunity arose to develop and present unusually detailed information on the distributions and ecological characteristics of all vascular plants inhabiting a major river drainage in western Montana. This area includes the Bitterroot National Forest and much of the Missoula Ranger District of the Lolo National Forest. Botanist Klaus Lackschewitz had studied the area's flora intensively for over 20 years and was willing to prepare his findings in book form to be published by the Forest Service. Personnel of the Forest Service's Intermountain Research Station and Northern Region recognized that this unique information would be useful for land management and planning; for example, for assessing biological diversity and identifying sensitive species. It would also enhance both scientific and general knowledge of the environment.

The first installment of this information was published (Lackschewitz 1986) as an annotated checklist of the more than 1,500 species (taxa), categorizing the abundance, habitat relationships, and geographic distribution of each. The remainder of this information, presented here, consists of keys and illustrations for identifying each species and brief descriptions of each plant's distinctive morphological and ecological features.

This guide can be unusually definitive because it concentrates on the flora of a small region—about 7,800 square kilometers (3,000 square miles)—rather

than an entire State. Another advantage to the user is that the identification aids are the work of field-oriented botanists (Lackschewitz and technical editors Lesica and Cooper) who have focused on the most easily observable diagnostic features of each species. We suspect that similarly detailed botanical information could be developed for other public lands by working with local botanists.

Stephen F. Arno, Fire Effects Unit
Intermountain Research Station

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Vascular Plants of West-Central Montana—Identification Guidebook

Klaus Lackschewitz

THE SETTING

This report identifies and describes the more than 1,500 species and varieties (taxa) of plants found in the Bitterroot River drainage and adjacent small watersheds in the vicinity of Missoula in west-central Montana (fig. 1). This area includes all of Ravalli County and part of Missoula County. About two-thirds of this land area lies within the Bitterroot and Lolo National Forests. It is located between lat. 45°27' and 47°6' N. and between long. 113°31' and 114°31' W.

The study area consists of a large mountain valley extending 113 km (70 mi) southward from Missoula (elevation 975 m; 3,200 ft), surrounded by high, forested mountain ranges. The crest of the Bitterroot Mountains forms the western and southern boundaries of the area, the Continental Divide forms a portion of the southeastern boundary, and the crest of the Sapphire Range forms the eastern boundary. The crest of the Rattlesnake/Jocko Mountains serves as the extreme northern boundary. The high ridges and peaks generally exceed 2,130 m (7,000 ft) in elevation, and numerous summits in the Bitterroot Range surpass 2,740 m (9,000 ft), sufficient for development of an alpine zone above the limit of erect trees. Conversely, the lower portions of the major valleys are near or below the lower limits of the coniferous forest (Arno and Hammerly 1984).

The Bitterroot and Missoula Valleys of west-central Montana and their surrounding mountain ranges experience an inland mountain climate moderated considerably by the intrusion of air masses originating over the northern Pacific Ocean. As the Pacific air masses push eastward (inland), they are forced to rise over the Cascade Range and the mountains of northern Idaho, releasing much of their moisture in these areas. Thus, west-central Montana lies in a rain shadow that is often dominated by "dried out" Pacific air. Missoula, Stevensville, and Hamilton in the valley bottoms receive an average of only 33 cm (13 in) of precipitation annually, although cloudiness is prevalent and relative humidity is moderately high except in the warm, dry summer months of July and August.

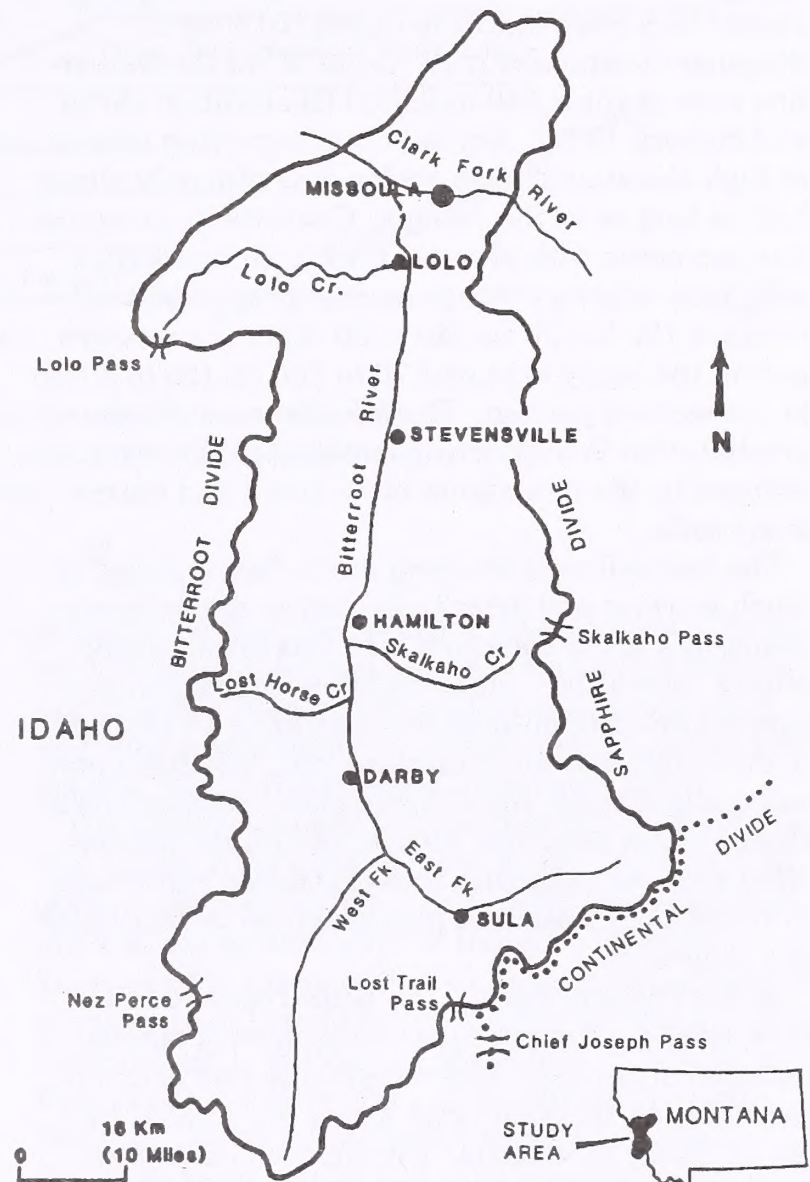


Figure 1—Outline map of the area of west-central Montana covered in this report.

Autumn is cool and relatively dry. Winters are consistently cold and rather moist. During most winters there are occasional, usually short periods when extremely cold (below -18 °C [0 °F]) continental polar air masses dominate. This arctic air enters from the north and east. Winter snowfall is moderate at lower elevations, but very substantial in the subalpine zone, where snow depth reaches 1.5 to 3 m (5 to 10 ft) in April. Spring is usually cool and moist, with numerous rain showers in May and June. At lower elevations these are the months

receiving the greatest precipitation. Finklin (1983) provides a detailed description of the area's weather and climate.

Microclimate is greatly influenced by the mountainous topography, resulting in diverse environments for vegetation. For instance, the mean temperature of the warmest month (July) is 19 to 20 °C (65 to 68 °F) at major valley stations from Missoula at an elevation of 975 m (3,200 ft) to Darby at 1,183 m (3,880 ft); whereas the July mean is only about 10 °C (50 °F) in the alpine zone atop Saint Mary Peak (2,927 m [9,365 ft]) west of Stevensville and about 12 °C (53 °F) in the timberline zone at the 2,440-m (8,000-ft) elevation (Arno and Habeck 1972). Not only is the growing season at high elevations much cooler, it is also only about half as long as in the valleys. Conversely, precipitation increases with elevation, with the timberline zone receiving an average annual precipitation of perhaps 100 to 130 cm (40 to 50 in) in the western part of the study area and 75 to 100 cm (30 to 40 in) in the eastern portion. The effectiveness of this precipitation in supporting moist-site vegetation is reduced by the abundance of rockland and coarse stony soils.

The microclimate on steep south-facing slopes is much warmer and drier than that on north-facing slopes at a given elevation, and this dramatically affects vegetation. Also, wind-exposed ridgetops support desiccation-tolerant vegetation in contrast to the bottoms of mountain canyons, which support moist-site species, including disjunct populations of Pacific Coast maritime plants. Mountain canyons often serve as collection areas for cold air drainage in which high mountain plants extend to unusually low elevations.

In the Tertiary Period, the Bitterroot and Clark Fork river valleys were deeply filled with alluvial material; during the Pleistocene this was partially covered with till from large alpine glaciers in the surrounding mountains. During the Pleistocene, until about 12,000 years ago, Glacial Lake Missoula inundated the valleys up to an elevation of 1,326 m (4,350 ft) (Alt and Hyndman 1986). The lake alternately drained and refilled at least 36 times as its ice dam, a lobe of the continental glacier, alternately washed out and redeveloped. The fillings were to varying depths and are marked by shorelines of different elevations. Extensive layers of glacial lake sediments, notably silts, were added to the valleys during this period. Today, alluvial soils of different depths and qualities cover the bottomlands, terraces, and lower slopes.

The major valleys are primarily devoted to small farms and ranches, rural communities, and small cities. As of 1990 nearly 100,000 people live in the area, about 70,000 of them in the greater Missoula

vicinity. Much of the farm and pasture land is irrigated to some extent with snow-melt water diverted from mountain streams. Since the 1870's, irrigation and subirrigation has increased the valley land area suitable for moist-site vegetation, and has resulted in some downslope spread of mountain plants along ditches. The higher mountains exhibit rugged features characteristic of alpine glaciation, although only the Bitterroot Range, from Lolo Creek to the West Fork of the Bitterroot River, was heavily sculptured, with a succession of parallel glacial troughs emptying eastward into the Bitterroot Valley.

Vegetative zonation in west-central Montana is illustrated in figure 2. The zones of potential climax vegetation or habitat types (Mueggler and Stewart 1980; Pfister and others 1977) begin with bottomland ponderosa pine (*Pinus ponderosa* var. *ponderosa*) and broadleaf (*Populus* spp., etc.) communities on moist sites in the major valleys. Dry sites in the major valleys represent bunchgrass habitat types (*Agropyron*, *Festuca*) or ponderosa pine/bunchgrass habitat types. Substantial amounts of the major valley habitat have lost their native vegetation and are being used as pasture or for urban, suburban, or rural developments. Most of the mountain landscape lies within forest habitat types where Douglas-fir (*Pseudotsuga menziesii* var. *glauca*), grand fir (*Abies grandis*), or subalpine fir (*Abies lasiocarpa*) represent the potential climax, and native vegetation predominates. As a result of past fires, extensive stands of lodgepole pine (*Pinus contorta* var. *latifolia*) cover the broad slopes at middle and upper elevations. Most lower and many mid-elevation forests have been logged, starting in the late 1800's, but native tree and undergrowth species regenerated.

Although geology varies substantially among the mountain ranges (Ross and others 1955), its effect on vegetation is subtle and largely unknown, unlike some mountainous areas farther east in the Rockies in more continental climates (Pfister and others 1977). In the mountains north of Missoula (fig. 1), the main drainage, Rattlesnake Creek, flows through a glaciated valley and has carved a course through different layers of rock, exposed in many places. These are mostly strata of the Missoula Group of Precambrian sedimentary layers, with differently colored argillites and quartzites; but one broad band of Precambrian limestone is also evident in the lower part of the drainage. The higher ridges and peaks in this area reach elevations of 2,200 to 2,620 m (7,200 to 8,600 ft) and are covered by timberline vegetation.

The Sapphire Mountains (fig. 1) border the east side of the Bitterroot Valley. These mountains rise up gradually via broad gentle slopes, but south of

at lower elevations. Continuous sods have developed only in small areas of the timberline and alpine zones. More often, *Carex nigricans* and other species form a sod locally in moist subalpine basins. In rocky, nonforested areas at high elevation, most vegetation appears in cracks and crevices and in fellfield-like situations. Soils developed from the Idaho batholith granites are strongly acidic.

The Lolo Creek, O'Brien Creek, Blue Mountain area west of Missoula (fig. 1) is characterized by mountains of modest height, with few summits reaching 2,130 m (7,000 ft) in elevation. The Lolo Creek valley provides a major low-elevation route up to the Bitterroot/Clearwater River divide at 1,585-m (5,200-ft) Lolo Pass. Highway U.S. 12 follows the general route of explorers Lewis and Clark up Lolo Creek to the pass. Immediately west of the pass lies the moist inland-maritime forest of the Clearwater River drainage, in northern Idaho, where Pacific coast conifers are abundant. These include western redcedar (*Thuja plicata*), grand fir, Pacific yew (*Taxus brevifolia*), western white pine (*Pinus monticola*), and mountain hemlock (*Tsuga mertensiana*). Little of this maritime vegetation extends eastward into the Lolo Creek drainage or elsewhere into west-central Montana (Arno 1979).

From the Lolo Creek valley north to the Clark Fork River, most of the country is underlain by layers of the Precambrian Belt sedimentary rocks. These rocks surface also on Mormon Peak and the northeastern tip of the Bitterroot Range. In the vicinity of Lolo Hot Springs a distinctive granitic intrusion is known as the Lolo batholith.

Although it has a relatively mild, Pacific-influenced climate, this region's forests are generally drier than those of either northwestern Montana or adjacent northern Idaho (Arno 1979). Thus, west-central Montana has only small amounts of Pacific Coast forest species such as western redcedar, western white pine, Pacific yew, *Clintonia uniflora*, *Adenocaulon bicolor*, and *Tiarella trifoliata*, and these species are largely restricted to moist canyon-bottom sites or seepage areas. Some of these small populations may be remnants of extensive distributions that occurred during a wetter climatic period. Grand fir is locally common, but is much less abundant than it is farther west. West-central Montana is, however, characterized by an abundance of intermountain forest species, which become rare farther east. These include western larch (*Larix occidentalis*), alpine larch (*Larix lyallii*), Pacific ponderosa pine (var. *ponderosa*), *Xerophyllum tenax*, *Menziesia ferruginea*, and *Luzula hitchcockii*.

Prior to 1900, fires were very frequent at lower and middle elevations (Arno 1980), with the result that seral fire-resistant and fire-initiated species

(trees, shrubs, and herbs) were abundant. For instance, open parklike stands of fire-resistant ponderosa pine occupied much of the zone in which Douglas-fir represents the potential climax (Gruell and others 1982). On north-facing slopes and at middle elevations fire-initiated forests were made up largely of seral western larch (in the northern half of the area) and lodgepole pine. Fire suppression since the early 1900's has allowed the more shade-tolerant, potential climax species to increase in abundance. Forest managers are attempting to again stimulate seral tree and shrub species through silviculture and prescribed burning.

To sum up, the mountainous landscape of west-central Montana supports a complex mosaic of vegetative communities. Macroclimatic differences are represented in the elevation-related zonation pattern (fig. 2). Microclimate also has a pronounced effect related to the rugged topography. Edaphic effects are superimposed upon those of climate and microclimate; these include patterns of talus or exposed bedrock sites among those with residual soils or alluvial deposits. Disturbance patterns related to fire, snow avalanches, grazing, logging, or land development add a successional dimension to the site mosaic. This mosaic of sites and disturbances results in diverse vegetation.

FLORA

In this area of west-central Montana, 1,607 taxonomic entities (taxa) have been collected. These include 1,501 species and 106 well-defined varieties, representing 485 genera and 106 families. Introduced species total 250. These are most numerous in the populated valleys. In contrast, in the timberline and alpine zones only one introduced species was found—common dandelion (*Taraxacum officinale*) (Lackschewitz 1970). Although this list is the result of considerable investigation, users may well find additional species in the study area; and in that case, the author would appreciate being informed of such discoveries.

Of the 12 species strictly endemic to Montana, five occur in our study area (Lesica and others 1984). These are:

<i>Arabis fecunda</i>	Endemic in
Rollins	western Montana
<i>Draba daviesii</i>	Restricted to the
(C.L. Hitchc.) Rollins	Bitterroot Mountains
<i>Lesquerella humilis</i>	Restricted to the
Rollins	Bitterroot Mountains
<i>Saxifraga tempestiva</i>	Endemic in
Elvander & Denton	western Montana
<i>Trisetum orthochaetum</i>	Endemic in Missoula
Hitchc.	County

In addition to the endemics mentioned, 22 species occur in Montana only in our study area of Ravalli County and southwestern Missoula County:

Agrostis borealis
Allium acuminatum
A. parvum
A. simillimum
Athysanus pusillus
Castilleja covilleana
Chrysosplenium tetrandrum
Erigeron evermannii
Eriogonum pyrolifolium v. *coryphaeum*
E. umbellatum v. *stellatum*
Eupatorium occidentale
Idaho scapigera
Lewisia columbiana
Linanthastrum nuttallii
Lomatium bicolor
Mertensia bella
Penstemon payettensis
Saxifraga tolmiei
Sedum debile
Synthyris missourica
Trifolium eriocephalum
T. gymnocarpon

The main distributions of these species lie to the west of Montana. In fact, the vegetation of the Bitterroot Mountains is similar to that of the Cascade Mountains of Washington and Oregon in several respects: an abundance of plants of the heath family (Ericaceae), the dominance of *Carex nigricans* in moist sites at high elevations, and the appearance at and above timberline of two tall herbaceous plants, *Angelica roseana* and *Polygonum phytolaccaefolium*.

Seven species common and widespread in Montana mountain ranges, including the Sapphire Range, could not be found in the Bitterroot Mountains. These are: *Agropyron latiglume*, *Poa alpina*, *Anemone multifida*, *Oxytropis* (all species), *Bupleurum americanum*, *Androsace septentrionalis*, and *Viola canadensis*.

EARLY BOTANICAL EXPLORATION

Meriwether Lewis and William Clark were the first European explorers and botanical collectors in west-central Montana. They traversed the Bitterroot River and Lolo Creek valleys twice; first on their journey west in early September 1805, then on the return trip in June and July 1806. According to Cutright (1969), *Cypripedium montanum*, the white lady's slipper orchid, was first collected and described by Lewis at or near Lolo Hot Springs on June 30, 1806. Four species were collected July 1, 1806, at "Traveller's Rest" at the mouth of Lolo

Creek. These collections were later described and named by German botanist Frederick Pursh: *Lewisia rediviva* (bitterroot, the Montana State flower), *Sedum stenopetalum* (stonecrop), *Orthocarpus tenuifolius* (owl-clover), and *Trifolium microcephalum* (small-head clover). (Thompson [1985] provides a more detailed account of Lewis and Clark and other botanical collectors in Montana prior to 1865.)

Nathaniel Wyeth was the next plant collector to travel through west-central Montana. Born in 1802 in Cambridge, MA, Wyeth became a friend of Thomas Nuttall, the famous Harvard University botanist. When Wyeth prepared an overland expedition to the Oregon country, Nuttall asked him to bring back a few plants. Traveling south from the Flathead Valley, Wyeth entered the Bitterroot Valley near the present city of Missoula in the spring of 1833 and departed it from the south across Gibbons Pass. Although he collected a great number of plants, most of them were lost or spoiled by accidents. Still, Wyeth delivered 113 species to Nuttall, who described the genus *Wyethia* in his honor.

In 1843, Karl Andreas Geyer collected here. Geyer was born in 1809 in Dresden, Germany—a gardener's son who became a gardener himself. He developed a keen interest in botany and corresponded for years with Sir William Jackson Hooker, a leading English botanist who profoundly influenced him. On his second expedition to the American West, Geyer traveled through the Beaverhead Valley and across Gibbons Pass to the Bitterroot Valley. He stayed at Father Pierre DeSmet's newly established St. Mary's Mission at today's town of Stevensville. Geyer was hospitably received and used the Mission as a base camp for exploring and collecting. He remained until mid-winter 1843-44, when he left for Spokane. In his reports, he praised the beauty of the Bitterroot Valley and the surrounding mountains and forests. He wrote eloquent accounts of the area's gigantic old ponderosa pines and of the majestic *Thuja* trees (western redcedar) in the mountain canyons to the west. He also described the Indian (Salish) inhabitants and their methods of collecting camas (*Camassia quamash*) bulbs and bitterroots. About a dozen species were named after Geyer, including the following plants common in our area: *Carex geyeri*, *Allium geyeri*, *Physaria geyeri*, and *Salix geyeri*ana. He also named several frequently occurring species, including *Melica bulbosa*, *Viola orbiculata*, *Ranunculus alismaefolius*, and *Microseris nutans*.

Sereno Watson first named and described about three dozen of our common plant species, including *Aquilegia flavescens*, *Lomatium cous*, *Lonicera*

utahensis, and *Saxifraga occidentalis*. Watson also established three new genera—*Hesperochiron*, *Lesquerella*, and *Orogenia*; however, this was only a minor part of the scientific contributions of this self-taught botanist. Watson came first to the West with the King expedition in 1867. He then served as a general handyman and horse wrangler. In 1880 he traveled from Dillon through the Bitterroot Valley to Missoula and then westward over Lolo Pass. On this trip he was collecting for the Gray Herbarium, now located at Harvard University.

From 1880 to 1923, Marcus E. Jones lived in Salt Lake City and collected mainly in the Great Basin; but his wide-ranging collecting expeditions led him at least once into the Bitterroot Valley. This is documented by his 1910 collection of *Trifolium gymnocarpon*, hollyleaf clover, from the valley of the West Fork of the Bitterroot River. Marcus Jones became a leading botanist, discovering and naming several plants native to western Montana.

During the 19th century, botanists and plant collectors in our region were explorers, mostly from the cultural centers of the eastern United States. In the late 1800's, the founding of the State university at Missoula (now the University of Montana) and the agricultural college at Bozeman (now Montana State University) ushered in the era of resident botanists. The history of floristic exploration in the western United States has always been closely connected to the personalities teaching botany and the curators of the herbaria. Morton G. Elrod, who joined the University of Montana in 1897, was a biology professor and an active botanical collector in western Montana. By 1909 he had obtained about 7,000 botanical specimens, which he entrusted to his colleague J. E. Kirkwood. Kirkwood became an immensely active botanist and forest ecologist. He formally established the University of Montana herbarium and collected extensively even in the rugged mountains, traveling by horseback and afoot. For instance, he was the first botanist on Lolo Peak and Trapper Peak.

In 1932, C. Leo Hitchcock took over as curator of the University of Montana herbarium. A nationally known botanist and leading author of today's standard Pacific Northwest floras (Hitchcock and others 1955-69; Hitchcock and Cronquist 1973), he devoted much of his time to exploration and collecting throughout western Montana, from bottom lands to mountain summits. By 1937, when Hitchcock left for a similar position at the University of Washington in Seattle, he had helped broaden and modernize the mission of the herbarium, striving to build a complete representation of the native flora to serve both science and the public.

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HOW TO USE THIS MANUAL

To identify an unknown plant, first use the Key to Plant Families (page 12). Once the correct family has been determined, use the key to the genera which follows the description of the morphological characters of the family. After identifying the genus, use the key to species within the genus.

The keys are dichotomous, consisting of a series of paired alternatives, each preceded by the same number. The two statements are designed to be mutually exclusive. Examine the specimen and its habitat and decide which alternative is true. Be sure to read both alternatives before making a decision. At the end of the chosen alternative there is a number or a name. A number directs you to another couplet (pair of alternatives) in the key. Repeat the above procedure, choosing the appropriate statement in each couplet until a name is

arrived at. Verify the family, genus, and species indicated in the keys by reading the descriptions of that family, genus, and species following the keys. To avoid excessive repetition, words used in species descriptions are usually explained in the descriptions of the family or genus. Technical terms are also explained in the Glossary (page 8).

To aid identification, some of the larger genera have been divided into subgeneric groups based on similarity of appearance or habitat (for example, species with yellow flowers, species of meadows). Within genera and the subgeneric groups, species followed by their descriptions are presented in order of their decreasing commonness in west-central Montana. The distribution listed at the end of each description is for the species, not any particular variety or subspecies. Taxonomic nomenclature used here generally follows that of Hitchcock and Cronquist (1973).

Dichotomous keys have often been adapted from those in Hitchcock and others (1955-69), Dorn (1984), and Kuijt (1982). Species descriptions were developed by the author based on field experience and Davis (1952), Dorn (1984), Harrington (1954), Hermann (1970), Hitchcock and others (1955-69), Moss (1959), and Weber (1976), and were edited to follow the style and order of Hitchcock and others (1955-69).

Species are grouped by division, and divisions are organized phylogenetically, with the more primitive plants first. Thus the nonflowering plants (club-mosses, horsetails, ferns, and conifers) are placed first, followed by the flowering plants, which are further divided into dicots (broad-leaved plants) and monocots (grasses, sedges, lilies, etc.). Within these groups, species are arranged alphabetically by family, genus, and species. Scientific names follow the nomenclature of "Flora of the Pacific Northwest" by Hitchcock and Cronquist (1973). A small number of species in the checklist are not found in Hitchcock and Cronquist, and references must be sought in the recent literature or in a flora of the eastern United States, such as Gleason and Cronquist (1963). Scientific names that have widespread use but are considered incorrect by Hitchcock and Cronquist (synonyms) are placed in brackets and follow the accepted name. Each scientific name (taxon) is followed by a common name, most of which are also taken from "Flora of the Pacific Northwest."

Two additional species were found so recently that they could not be incorporated in this manual. They are *Atriplex heterosperma* and *Suaeda depressa*, both members of Chenopodiaceae. Both are rare in our area and were found on the east side of the Bitterroot Valley. They are indicators of alkaline soil.

GLOSSARY

- A-**. A prefix denoting a lack or without.
- Achene**. A dry, 1-seeded fruit that does not open along regular lines.
- Acuminate**. With concave sides long tapering to a point.
- Acute**. With mostly straight sides tapering to a sharp point.
- Adventitious**. Arising not from the usual place.
- Alpine**. Occurring above treeline in mountains.
- Alternate**. Arranged with one structure (leaf, stem, etc.) per node.
- Amphibious**. With the potential to inhabit water or land, but not removed from surface water.
- Annual**. A plant, usually with slender taproot, completing its life cycle in a single growing season.
- Anther**. The pollen-bearing portion of the stamen, remote from the point of attachment.
- Anthesis**. That period when a flower is open for pollination.
- Apex**. The furthest or highest point, the tip.
- Apical**. At the top or tip.
- Appressed**. Pressed close to another organ or surface.
- Aquatic**. Growing (anchored or floating) in water.
- Armed**. Exposed surface having thorns, prickles, or spines.
- Aromatic**. Giving off a strong, usually agreeable odor.
- Ascending**. Rising/growing upward at an oblique angle relative to structure to which attached.
- Awl-shaped**. A cylinder tapering at one end.
- Awn**. A slender, stiff, and generally terminal bristle.
- Axil**. The angle formed at intersection of two structures, usually referring to the junction of petiole with stem.
- Axillary**. Located in axil of structure named.
- Banner**. The upper, medial, and usually enlarged (largest) petal of pea family (Fabaceae) flowers.
- Beak**. A prolonged, slender, and tapering projection.
- Bearded**. Set with hairs, usually stiff ones.
- Berry**. Strictly defined, a fleshy or pulpy fruit developed from a single ovary with more than one seed, such as a grape or blueberry; loosely applied to any fleshy or juicy fruit.
- Bi-**. Prefix denoting two or twice.
- Biennial**. Plant completing its life cycle in two growing seasons; usually forming basal rosette 1st season and flowering in the 2nd.
- Bisexual**. Flower with both stamens and pistil.
- Blade**. A leaf's flat, expanded portion, distinguished from the petiole.
- Boreal**. Of or pertaining to forests and tundra of the North Temperate and Arctic regions.
- Bract**. Modified, usually reduced leaf, mostly associated with the flower or inflorescence.
- Bracteate**. Having bracts.
- Bud**. Growing tip of a stem or branch or in leaf axil; usually dormant and scale covered.
- Bud-scale**. Scalelike modified leaf covering a dormant bud.
- Bulb**. Underground organ constituted mostly of fleshy storage leaves and scale covered, as in onions.
- Bulbil**. Small, bulblike organ for vegetative reproduction, usually in leaf axil in place of a flower.
- Bundle scar**. Minute traces within leaf scar where vascular bundles passed from stem or branch to the petiole.
- Caespitose (or cespitose)**. Growing in dense, usually low tufts.
- Calcareous**. Limey, with high concentrations of calcium carbonate.
- Calyx**. A flower's sepals considered as a unit.
- Capillary**. Hair- or threadlike.
- Capsule**. A dry fruit of more than one carpel that splits along regular lines.
- Carpel**. The modified foliar unit of angiosperms which bears ovules; a pistil is composed of one or more carpels.
- Catkin**. In willows, birches, and alders, an elongate, pendulous or conelike flower cluster with minute flowers that lack, or nearly so, petals and sepals.
- Caudex**. A short, mostly vertical, persistent stem at, or just below, the ground surface from which new stems arise yearly.
- Cauline**. On the stem.
- Chaff**. Thin, dry scales.
- Circumboreal**. Plant occurring in lands encircling North Pole.
- Clasping**. Partly surrounding the stem.
- Cleft**. Cut midway, or slightly deeper, to the base or midrib.
- Compound (leaf)**. One which is divided into two or more distinct leaflets.
- Concave**. With a hollowed out surface, like the inner surface of a bowl.
- Cone**. A dense cluster of modified, leaflike organs bearing pollen, spores, or seeds as in the horsetails, club mosses, and conifers (pine cone).
- Cone scale**. The modified leaf- or bractlike organs of conifer cones, upon which are borne the seeds.
- Convex**. With a surface that curves outward from viewer's perspective, like outer surface of a bowl.
- Cordate**. A stylized heart-shape, with the point at the apex and notch at the base.
- Corolla**. All the petals considered as a unit.
- Corrugated**. Surface with many folds or wrinkles.
- Cotyledon**. An embryonic leaf of a seed's embryo that often expands at germination.
- Crown**. In herbaceous perennials, the persistent base or top portion of root; the topmost leafy portion of a tree.
- Culm**. The stem of a grass or sedge.
- Deciduous**. Falling off once a year, especially at end of growing season.
- Decumbent**. With the base prostrate or gently up-curving and tips erect or ascending.
- Dehiscent**. Opening along predesignated lines.
- Determinate (inflorescence)**. One in which the terminal flower opens first and stops further growth of the axis.
- Dioecious**. Having male and female flowers or cones borne on separate plants.
- Disk**. In Asteraceae, the central portion of the head giving rise to the disk flowers.

Disk flower. In Asteraceae, the flowers with slender, tubular corollas at central part of the head.

Dissected. Divided into multiple lobes or segments.

Distal. Positioned toward tip or end opposite attachment point.

Dorsiventral. The direction in which leaves are commonly flattened, distinguished from lateral flattening.

Elliptic. Widest at the middle and tapering to both ends.

Emergent. With lower portion in the water, the upper portion extending out.

Endemic. Found only within a circumscribed geographic area.

Entire. With margins not cleft, cut, or otherwise toothed.

Epidermis. The outermost cell layer of plant organs.

Ephemeral. Lasting for only a short time.

Exserted. Projecting beyond an enveloping structure, as stamens from a corolla.

Family. A grouping of related genera.

Fertile. Describing organs associated with the production of spores, pollen, or seed in distinction to similar ones that do not.

Fibrous rooted. With several to numerous branch roots all about the same size, lacking a larger central axis.

Filament (of stamen). The thin stalk of a stamen, the tip of which bears the anther.

Floral tube. A tubelike structure consisting of the fused lower portions of the sepals, petals, and stamens.

Floret. A little flower, one of a definite cluster; in Poaceae, the highly modified flower consisting of lemma and palea and enclosed stamens and pistil (if fertile).

Foliaceous. With leaflike texture.

Frond. The leaf of a fern.

Fruit. Mature ovary, including attached external structures and enclosed seeds.

Galea. The hoodlike, usually elongated upper portion of the perianth of certain species, as in the upper corolla lip of *Castilleja* spp.

Genus (pl. genera). A grouping of related species.

Glabrous. Smooth, lacking hairs.

Gland. A location on an organ's surface or expanded tip of hair which secretes minute, sticky drops.

Glandular. Having secretory structures, especially hairs.

Glaucous. Having a fine, waxy, easily wiped-off powder that results in surfaces with a whitish or bluish cast.

Globose. Shape approaching that of a sphere or globe.

Glume. One of usually two chafflike bracts located at the base of a grass spikelet subtending the aggregate of florets, not individual floret.

Gymnosperm. A member of the plant group characterized as having ovules not enclosed in an ovary.

Habit. The general appearance or growth form of a plant.

Habitat. The environmental conditions or kind of place in which a plant grows.

Head. Type of inflorescence with mostly sessile flowers densely set on a very short axis or disk, thus having a round outline. A terminal collection of flowers surrounded by an involucre (Compositae!).

Herb. Plant with the aerial portion nonwoody, dying back to ground at end of growing season.

Herbaceous. Not woody, dying back at end of growing season; leaflike in texture and color.

Hirsute. Having coarse, stiff, but not sharp-pointed hairs.

Host. The plant from which parasite obtains nutrients.

Hypanthium. Tube or cup around ovary formed by the fusion of the lower parts of the calyx, corolla, and androecium; if petals and stamens look to arise from calyx tube then the hypanthium is that portion of the tube below the petals' insertion.

Indeterminate (inflorescence). Not terminating in a flower and continuing to grow at the apex.

Indehiscent. Not normally opening, at least not along regular or predetermined lines.

Indusium. In certain ferns a thin, membranous epidermal flap or folded leaf margin that covers a sorus.

Inferior ovary. Ovary that has floral tube fused to its top.

Inflorescence. The flowering portion of a plant or the arrangement of flowers along the axis.

Internode. That part of a stem between two adjacent nodes (points of leaf or branch origin).

Involucre. Any set of structures that surround the base of another structure, usually bracts or microphylls attached below a flower(s).

Irregular (flower). Characterized by bilateral symmetry, that is, can be divided into two equal parts in only one plane.

Jointed. With conspicuous or swollen nodes or points of articulation.

Keel. A prominent, longitudinal ridge; in Fabaceae the boat-shaped structure formed from partial fusion of two lower petals.

Lanceolate. Lance-shaped, that is, widest at base, with straight sides long-tapering to a point.

Leaflet. One of several distinct portions of a compound leaf.

Leaf scar. Following a leaf's abscission, the trace left on stem or branch just below the bud.

Legume. Member of Fabaceae; dry fruit of this family form a single carpel opening along two sutures (lines of fusion).

Lemma. One of two (lemma and palea) bractlike structures subtending the individual flowers (florets) of grass spikelets; the one on the side away from main axis.

Ligulate (inflorescence). In Asteraceae, a head possessing only ray (ligulate) flowers.

Ligule. In graminoids, a small, erect projection or fringe, which is a continuation of the sheath; located at the junction of blade and sheath.

Linear. Long and narrow with nearly parallel margins.

Lip. The prominent lower portion of a flower, as the lower petal of orchids.

Lobe. Any projecting segment of an organ, usually part of leaf blade, with sinuses to either side.

Megasporangium. Receptacle containing megaspores.

- Megaspore.** The larger of two spore sizes produced by some plants.
- Membranous.** Thin, flexible, usually whitish and translucent.
- Mesic.** Defining position near middle of inferred moisture gradient, neither very moist nor dry.
- Monoecious.** Having unisexual flowers, both sexes borne on the same plant.
- Mycorrhiza.** The symbiotic combination of a fungus and a plant root.
- Naked.** Lacking various organs or appendages, as a naked flower lacking a perianth.
- Nerve.** A prominent vein of leaves or other organs.
- Node.** A joint or point of origin for leaves or branches.
- Nut.** A dry, hard-walled and indehiscent fruit, generally with one seed.
- Ob-.** Prefix meaning in a reverse direction or upside-down.
- Oblanceolate.** Lance-shaped, broadest at the tip and tapering, almost to a point at the base.
- Oblong.** Longer than wide in outline, with somewhat parallel margins.
- Obovate.** Egg-shaped in outline (flat organs), with the widest point near the apex.
- Obtuse.** Blunt; the sides converging at an angle of >90 degrees.
- Opposite.** Nodes having two leaves or branches set directly across from each other.
- Orbicular.** With a circular outline.
- Oval.** Outline broadly elliptic, widest at the middle.
- Ovary.** That part of the pistil containing ovules, and later in development, the seeds.
- Ovate.** Egg-shaped in outline.
- Ovule.** One of numerous small structures in ovary (flowering plants) or female cone (conifers) that, following fertilization, develops into a seed.
- Palea.** The uppermost and main axis-facing of paired bractlike structures subtending the individual flowers (florets) of grass spikelets.
- Panicle.** Indeterminate inflorescence in which from each stalk arising from the main axis nodes there is borne more than one flower.
- Pappus.** In Asteraceae, the highly modified calyx composed of scales, bristles, awns, or short crown at achene tip.
- Pedicel.** Stalk of an individual flower.
- Peduncle.** Stalk of an inflorescence (flower cluster) or individual flower when only one per plant.
- Pendant.** Drooping or hanging.
- Perennial.** Plant with potential to live more than 2 years.
- Perfect flower.** Having both female (pistil) and male (stamen) parts.
- Perianth.** Corolla and calyx considered collectively.
- Perigynium (plural perigynia).** Sheath or sac-like structure, unique to *Carex* and *Kobresia* spp., enclosing ovary and fruit.
- Petal.** A member of the whorl of floral organs, usually the most showy, just interior to the sepals and below the stamens.
- Petiole.** Stalk of leaf, as distinguished from the blade thereof.
- Pinnate.** Having 2 rows of lateral appendages (lobes, leaflets, etc.) distributed along a central axis.
- Pistil.** Organ formed from the combination of ovary, style, and stigma.
- Pistillate.** Having pistils but lacking stamens.
- Pith.** Spongy tissue at stem center.
- Pod.** Any kind of dry, dehiscent fruit, especially that of Fabaceae.
- Pollen.** Dustlike, usually yellow, cells produced in anther (flowering plants) or microsporangia (gymnosperms).
- Pollen cone.** The male, pollen-producing cone of gymnosperms.
- Prickle.** A sharp, stiff outgrowth of epidermal layer.
- Prostrate.** Lying flat on the ground.
- Pubescent.** Set with hair of any kind.
- Raceme.** Indeterminate inflorescence type with single and stalked flowers arrayed along main unbranched axis.
- Radial symmetry.** Capable of being divided through the center by into two mirror images by at least two planes of symmetry.
- Radiate.** Condition in Asteraceae of having the head's marginal flowers be ligulate and those of the center be tubular.
- Ray (flowers).** In Asteraceae the ligulate flowers attached to the disk.
- Receptacle.** The common, usually expanded point of attachment of floral organs; in Asteraceae the enlarged stem tip to which the head is attached.
- Recurved.** Curved back- or downward.
- Reflexed.** With an abrupt back- or downward bend.
- Regular flower.** One in which all the members of each set of parts are similar in size and shape; radially symmetrical, that is, divisible into two mirror halves in at least two planes.
- Rhizomatous.** Possessing rhizomes.
- Rhizome.** A creeping, underground, and generally horizontally oriented stem.
- Ribbed.** Having prominently raised veins or nerves.
- Root.** Underground part of plant that lacks nodes, leaves, and scales.
- Rootstalk.** Underground, creeping stem.
- Rosette.** A dense, usually basal, cluster of leaves radiating in all directions from stem.
- Rotund.** Round or rounded.
- Runner.** A slender, prostrate stem that roots at the nodes or tip.
- Saprophyte.** A plant with little or no chlorophyll and so obtaining nutrients from dead organic matter by a root association with a fungus.
- Scabrous.** Rough to the touch from having very short and stiff hairs.
- Scale.** Any small, thin, and flat structure.
- Seed.** A mature ovule which following germination gives rise to new plant.
- Seed cone.** The female, seed-producing cone of conifers.
- Sepal.** One of a whorl of typically green or greenish, leaflike, floral organs originating below the petals.

- Sessile.** Lacking a stalk.
- Sheath.** Generally a tubular structure that partly or wholly surrounds a plant part; specifically in the grass, rush, and sedge families, the lower stem-clasping portion of a leaf.
- Shrub.** Woody plant (sometimes only at base), generally with several stems originating from the base.
- Simple.** Unbranched, undivided, or single.
- Sorus.** In ferns, a cluster of sporangia.
- Spike.** An inflorescence type with stalkless (sessile) flowers arrayed along a main axis.
- Spikelet.** In the grasses, the smallest unit of a flower cluster, consisting of one to multiple florets (flowers) and their subtending glumes (usual case).
- Spine.** Uncritically, any structure having the appearance of a true spine, which is a slender, sharp-tipped structure derived from a modified leaf or stipule.
- Sporangium.** Sac-like container in ferns and allied taxa within which spores are produced.
- Spore.** Especially in ferns and allied taxa, a simple, usually one-celled and wind-dispersed reproductive structure.
- Stamen.** The male organ (pollen producing) of a flower, including anther sacs and supporting filament.
- Staminate.** Having stamens but lacking pistil (female portion).
- Standard.** Another term for the banner (large, upper, median petal) of the pea family (Fabaceae).
- Stem.** A main axis of a plant, ranging from upright to trailing, above ground or below; differentiated from roots by having nodes, buds, or scales.
- Sterile.** Lacking reproductive structures.
- Stigma.** The terminal, pollen-receiving and usually sticky portion of pistil.
- Stipule.** An appendage, gland- to leaflike, at the junction of petiole with stem.
- Stolon.** An elongate stem that grows along ground and roots at the nodes.
- Striate.** Having fine, mutually parallel grooves, streaks, or lines.
- Style.** The typically slender portion of the pistil connecting ovary to stigma.
- Sub-.** Prefix indicating almost, nearly, or under.
- Subtend.** To be borne directly below and close to, as a leaf subtending its axillary bud.
- Succulent.** Condition of being thick, fleshy, and juicy.
- Superior ovary.** One having the perianth parts originating directly below it.
- Surpass.** To go beyond or exceed.
- Symbols.** <, less than quantity to right of symbol; >, more than quantity to the right of symbol.
- Taxon (plural taxa).** Any taxonomic entity, regardless of rank (for example, variety, species or family).
- Talus.** A slope of rock rubble, usually at cliff face.
- Taproot.** The primary plant root which is considerably larger than any other root system branches.
- Teeth.** Short, rounded, or pointed projection (as on leaf margin).
- Tendrill.** A slender, clasping outgrowth of the leaf or stem that twines about contacted structures, gaining support for climbing plants.
- Tepal.** A perianth part when the perianth is not clearly differentiated into calyx and corolla.
- Thorn.** A stout, rigid, woody and sharp-pointed modified stem.
- Three-ranked.** Originating in threes from a common point or level.
- Throat (of corolla).** That portion of the corolla at the junction of the limb and tube of united corolla that is somewhat wider than the tube itself.
- Toothed.** Bearing teeth.
- Trailing.** Said of prostrate stems that do not root.
- Translucent.** Readily transmitting light but not sufficiently thin to see through.
- Turion.** A small, scaly, bulblike offshoot in some spp. of *Epilobium*.
- Twining.** Growth mode of partly creeping and partly coiling and climbing on other objects.
- Umbel.** A type of inflorescence with numerous stalked flowers that appear to radiate/ascend from a single point.
- Unisexual (flower).** Possessing either stamens or pistil, but not both.
- Urn shape.** Ovoid and with a small opening at the tip.
- Valve.** One of the two or more portions into which a capsule or pod separates at maturity.
- Vascular.** Concerned with conduction of water and nutrients, as vascular plants being those with xylem and phloem.
- Vegetative.** That portion of the plant not producing reproductive structures like cones or flowers.
- Vein.** A bundle of vascular tissue in leaf or flower part, usually externally obvious.
- Venation.** Pattern in which veins are arranged.
- Ventral.** Pertaining to location on front, lower (under), inner side, or side toward axis.
- Vernal.** Of, or occurring in the spring.
- Verticil.** A whorl of leaves or flowers.
- Viscid.** Sticky or greasy.
- Whorl.** Three or more organs (leaves, bracts, etc.) radiating from the same point or level.
- Woolly.** Possessing long, interwoven hairs.
- Xerophyte.** Plant adapted to dry environments.

KEY TO THE FAMILIES

In order to use the following key, it is necessary to have flowering material. In some cases fruit may also be necessary. When possible, examine numerous specimens.

1. Plants reproducing by spores (ferns, fern allies, clubmosses, horsetails).....2
1. Plants reproducing by seeds (conifers and flowering plants).....8
2. Stems jointed and grooved lengthwise, often easily pulled apart at the nodes; leaves reduced to papery scales, plants apparently consisting only of simple or branched stems.....EQUISETACEAE p. 28
2. Stems not as above; leaves present though sometimes small.....3
3. Leaves like a 4-leaf clover.....MARSILEACEAE p. 31
3. Leaves not as above.....4
4. Plants consisting of a cluster of long narrow leaves united at the base; spores borne in a pocket at the base of each leaf; plants growing in water or mud.....ISOETACEAE p. 24
4. Plants not as above.....5
5. Leaves small and scalelike; stems often resembling small juniper or cedar branches; spores borne at the top in conelike structures.....6
5. Leaves larger and usually lobed or divided (fernlike); spores not borne in cones.....7
6. Plants <2 cm (1 in) tall; generally occurring on rocks or in rocky or dry soil...SELAGINELLACEAE p. 26
6. Plants usually >2 cm tall; mostly in moist soil of forests or occasionally meadows.LYCOPODIACEAE p. 24
7. Spores borne on a specialized branch that rises from the base of the vegetative leaf.....OPHIOGLOSSACEAE p. 31
7. Spores borne on leaves that usually are similar to the vegetative leaves, and both kinds of leaves arise directly from the roots.....POLYPODIACEAE p. 33
8. Plants with flowers (sometimes inconspicuous); woody or, more often, herbaceous plants, usually with broad leaves that are mostly not evergreen.....ANGIOSPERMS (see below)
8. Plants lacking flowers; trees or shrubs with needle- or scalelike, mostly evergreen leaves.....9
9. Leaves scalelike and pressed flat to the stem or needlelike and whorled around the branches.....CUPRESSACEAE p. 43
9. Leaves needlelike, often borne in clusters.....10
10. Shrubs with blue seeds surrounded by a juicy, red berrylike structure.....TAXACEAE p. 53
10. Trees with seeds borne in cones.....PINACEAE p. 45

ANGIOSPERMS, FLOWERING PLANTS

1. Plants truly aquatic with submerged or floating leaves that become limp when withdrawn from the water (emergent plants with self-supporting stems are not included).....GROUP I
1. Plants emergent or non-aquatic.....2
2. Plants herbaceous with undivided leaves that are often narrow and have the main vein parallel to each other; petals and sepals in 3's or multiples thereof (Monocots).....GROUP II
2. Plants herbaceous or woody with simple or divided, usually net-veined leaves; petals and sepals usually in 2's, 4's, or 5's or multiples thereof (Dicots).....3
3. Plants trees, shrubs, or woody vines; a large portion of the above ground stems woody.....GROUP III
3. Plants herbaceous or woody only at the base.....4
4. Flowers without two distinct whorls of parts differentiated into petals and sepals (i.e., petals or sepals or both lacking or petals and sepals in a single undifferentiated series).....GROUP IV
4. Both petals and sepals present and differentiated from each other.....5
5. Petals separate from each other all the way to the base.....GROUP V
5. Petals united, at least toward the base.....GROUP VI

GROUP I

1. Stems lacking; entire plant floating and smaller (usually much smaller than 2 cm in diameter).....LEMNACEAE p. 603
1. Plants larger and usually with obvious stems.....2
2. Leaves large (>10 cm) and round to broadly elliptic in outline, borne on the ends of long petioles and floating flat on the surface of the water (water lilies).....NYMPHAEACEAE p. 291
2. Leaves smaller, narrower, or not always floating.....3

3.	Plants without leafy stems; all leaves grasslike and attached at the base.....	4
3.	Plants with leafy stems; leaf shape various.....	7
4.	Leaves with a sac of white spores at the base.....	ISOETACEAE p. 24
4.	Leaves without spore-sacs at the base.....	5
5.	Leaves with a well-differentiated blade, broader than the long petiole.....	SCOPHULARIACEAE (<i>Limosella</i>) p. 423
5.	Leaves grasslike, without a well-differentiated blade.....	6
6.	Leaves needlelike and round in cross section.....	CYPERACEAE (<i>Eleocharis</i>) p.510
6.	Leaves flattened, not needlelike.....	ALISMATACEAE p. 466, SPARGANIACEAE (vegetative forms) p. 635
7.	Underwater leaves highly dissected into hairlike segments.....	8
7.	Underwater leaves linear to elliptic but not dissected.....	11
8.	Leaves with small, egg-shaped bladders among the leaflets.....	LENTIBULARIACEAE p. 285
8.	Leaves without bladders.....	9
9.	Leaves 1 per node; flowers conspicuous, with yellow or white petals..	RANUNCULACEAE (<i>Ranunculus</i>) p. 354
9.	Leaves whorled (>2 per node); flowers inconspicuous, without petals.....	10
10.	Ultimate leaflets with toothed margins; stems usually green.....	CERATOPHYLLACEAE p. 108
10.	Margins of ultimate leaflets smooth; stems often reddish.....	HALORAGACEAE p. 248
11.	Leaves whorled (>2 per node).....	12
11.	Leaves alternate or opposite (1 or 2 per node).....	14
12.	Leaves scarcely 1 mm wide.....	NAJADACEAE ¹
12.	Leaves >1.5 mm wide.....	13
13.	Leaves mostly 6 per node.....	HIPPURIDACEAE p. 248
13.	Leaves mostly 3 or 4 per node.....	HYDROCHARITACEAE p. 590
14.	Submersed leaves opposite (2 per node).....	15
14.	Submersed leaves alternate(1 per node).....	16
15.	Leaves at least 2 cm long.....	ZANNICHELLIACEAE p. 637
15.	Leaves <2 cm long.....	CALLITRICHACEAE p. 79
16.	Submersed leaves narrowly elliptic to nearly round in outline (mostly <5 times as long as wide).....	17
16.	Submersed leaves linear and grasslike (mostly >10 times as long as wide).....	19
17.	Leaves with 4 leaflets, resembling a 4-leaf clover.....	MARSILEACEAE p. 31
17.	Leaves not divided into 4 leaflets.....	18
18.	Leaf veins parallel to each other or nearly so.....	POTAMOGETONACEAE p. 628
18.	Leaf veins branching off of the midrib.....	POLYGONACEAE (<i>Polygonum</i>) p. 320
19.	Base of the leaf expanded into a pale membranous appendage (stipule) that surrounds the stem.....	POTAMOGETONACEAE p. 628
19.	Base of the leaf without stipules.....	20
20.	Leaves on or near the surface shaped like an arrowhead.....	ALISMATACEAE p. 466
20.	Surface leaves linear or grasslike.....	21
21.	Base of leaves Y-shaped in cross section; flowers and fruits borne in round clusters.....	SPARGANIACEAE p. 635
21.	Leaves nearly flat at the base with a pale, membranous appendage on the inner surface (ligule) where it joins the stem; flowers and fruits not in round clusters.....	GRAMINEAE (<i>Alopecurus</i> p. 531, <i>Glyceria</i> p. 558)

GROUP II

1.	Plants leafless and parasitic on stems and branches of trees.....	LORANTHACEAE p. 286
1.	Plants not parasitic on trees.....	2
2.	Flowers unisexual, borne in dense globose or cylindrical clusters, male above female.....	3
2.	Flowers not as above.....	4

¹ Members of the water nymph family, Najadaceae, have recently been discovered in west central Montana but are not described in this publication. See Hitchcock and Cronquist (1973) for a description of the family.

3.	Flowers borne in a cylindrical spike (cattail).....	TYPHACEAE p. 637
3.	Flowers borne in globose clusters.....	SPARGANIACEAE p. 635
4.	Stamens and ovaries enclosed by bracts, petals and sepals lacking or reduced to bristles or scales (grasses and sedges).....	5
4.	Flowers with sepals and petals or undifferentiated tepals.....	6
5.	Stems mostly solid and often 3-sided; each flower subtended by 1 (rarely 2) bract(s); leaf sheaths (grasses).....	GRAMINEAE p. 516
5.	Stems hollow and usually round in cross section with conspicuous swollen nodes; each flower subtended by 2 bracts.....	CYPERACEAE p. 468
6.	Flowers bilaterally symmetrical, at least 1 petal different than the other 2 (orchids).....	ORCHIDACEAE p. 621
6.	Flowers radially symmetrical, all 3 petals or 6 tepals similar in size and shape.....	7
7.	Leaves pinnately divided into leaflets.....	LIMNANTHACEAE (a dicot with flower parts in 3's) p. 285
7.	Leaves sometimes lobed at the base but not divided into leaflets.....	8
8.	Leaves > 3 per node.....	RUBIACEAE (a dicot with flower parts in 3's) p. 390
8.	Leaves not more than 3 per node.....	9
9.	Base of petals and sepals (or tepals) attached to the top of the (inferior) ovary.....	IRIDACEAE p. 590
9.	Base of petals and sepals arising from base of the (superior) ovary.....	10
10.	Sessile flowers borne on an unbranched spike at the top of a leafless stem.....	JUNCAGINACEAE p. 603
10.	Inflorescence not as above.....	11
11.	Fruit a many-seeded capsule.....	12
11.	Fruit a berry, a globose cluster of 1-seeded achenes, or 1- or 2-seeded capsules (follicles).....	13
12.	Flower of 6 small (<8 mm) undifferentiated petals and sepals (tepals) that are brown or green.....	JUNCACEAE p. 592
12.	Petals or tepals white, yellow, blue, or orange, or if brown or green then >8 mm long.....	LILIACEAE p. 605
13.	Fruit a group of 3 1- or 2-seeded capsules (follicles).....	SCHEUCHZERIAACEAE p. 635
13.	Fruit a berry or globose cluster of achenes.....	14
14.	Fruit a berry.....	LILIACEAE p. 605
14.	Fruit a globose cluster of achenes.....	ALISMACEAE p. 466

GROUP III

1.	Plants twining or climbing, woody vines.....	2
1.	Plants trees or shrubs, erect or prostrate but not climbing or twining.....	6
2.	Leaves alternate (1 per node).....	3
2.	Leaves opposite or whorled (>1 per node).....	4
3.	Small, curling stems or modified leaves that grasp the supporting plant (tendrils) present.....	VITACEAE p. 466
3.	Tendrils absent.....	SOLANACEAE (<i>Solanum</i>) p. 443
4.	Leaves divided into leaflets.....	RANUNCULACEAE (<i>Clematis</i>) p. 350
4.	Leaves sometimes lobed but not divided into leaflets.....	5
5.	Leaves lobed or toothed with long petioles.....	MORACEAE p. 291
5.	Leaves with entire margins; petioles lacking or very short.....	CAPRIFOLIACEAE (<i>Lonicera</i>) p. 85
6.	Leaves and branches opposite or whorled (>1 per node).....	7
6.	Leaves and branches alternate (1 per node) or clustered at the base.....	26
7.	Leaves divided into leaflets.....	8
7.	Leaves sometimes lobed or toothed but not divided into leaflets.....	11
8.	Fruit a berry; inflorescence flat-topped or pyramid-shaped with numerous flowers.....	CAPRIFOLIACEAE (<i>Sambucus</i>) p. 86
8.	Fruit dry and 1-seeded, with or without a wing; inflorescence not as above.....	9
9.	Plants shrubs usually <30 cm (12 in) tall.....	RANUNCULACEAE (<i>Clematis</i>) p. 350
9.	Plants trees >1 m (3 ft) tall.....	10

10.	Lower leaflets with at least 1 shallow lobe as well as toothed margins.....	ACERACEAE p. 53
10.	Lower leaflets finely toothed.....	OLEACEAE p. 293
11.	At least some leaves with 3-5 lobes.....	12
11.	Leaves with toothed or entire margins but not lobed.....	13
12.	Leaves indented at point where petiole is attached; fruit dry, 1-seeded, and winged....	ACERACEAE p. 53
12.	Leaves not indented at the base; fruit berry-like.....	CAPRIFOLIACEAE (<i>Viburnum</i>) p. 88
13.	Leaves scalelike and 4 per node, <5 mm long.....	ERICACEAE (<i>Cassiope</i>) p. 227
13.	Leaves not as above.....	14
14.	Leaves covered with mealy, brownish or silvery scales on 1 or both surfaces.....	ELAEAGNACEAE (<i>Shepherdia</i>) p. 224
14.	Leaves not mealy.....	15
15.	Leaves with pointed teeth on the margins.....	16
15.	Leaves with entire or wavy margins, lacking sharp-pointed teeth.....	22
16.	Flowers tubular and >2 cm long.....	SCROPHULARIACEAE (<i>Penstemon</i>) p. 431
16.	Flowers not as above.....	17
17.	Leaves <3 cm (ca. 1 in) long.....	18
17.	Leaves mostly >4 cm long.....	19
18.	Plants creeping; stems hairy.....	CAPRIFOLIACEAE (<i>Linnaea</i>) p. 83
18.	Plants upright or spreading but not creeping; stems glabrous or nearly so.....	CELASTRACEAE p. 108
19.	Inflorescence with <12 flowers.....	20
19.	Inflorescence with >12 flowers.....	21
20.	Petals 10-20 mm long; fruit a capsule.....	HYDRANGEACEAE p. 248
20.	Petals minute or lacking; fruit berrylike.....	RHAMNACEAE (<i>Rhamnus</i>) p. 367
21.	Leaves with 3 main veins starting at or near the base; plants native in the mountains.....	RHAMNACEAE (<i>Ceanothus</i>) p. 367
21.	Leaves with only 1 main vein arising at the base; introduced and rare in the valleys.....	CAPRIFOLIACEAE (<i>Viburnum</i>) p. 88
22.	Flowers tubular and >2 cm long.....	SCROPHULARIACEAE (<i>Penstemon</i>) p. 431
22.	Flowers not as above.....	23
23.	Year-old twigs red.....	CORNACEAE p. 190
23.	Twigs usually not red.....	24
24.	Flowers with united petals, tubular to urn-shaped.....	CAPRIFOLIACEAE p. 83
24.	Petals separate.....	25
25.	Plants <30 cm (1 ft) tall and found in moist to wet areas; leaves leathery and <3 cm (1 in) long.....	ERICACEAE (<i>Kalmia</i>) p. 228
25.	Plants >30 cm tall, occurring in dry to moist areas; leaves >3 cm long.....	HYDRANGEACEAE p. 248
26.	Leaves divided into leaflets.....	27
26.	Leaves sometimes lobed but not divided into leaflets.....	35
27.	Leaves divided into linear segments.....	28
27.	Leaflets lance-shaped or wider.....	29
28.	Leaflets spine-tipped.....	POLEMONIACEAE (<i>Leptodactylon</i>) p. 311
28.	Leaflets not spine-tipped; foliage aromatic.....	COMPOSITAE (<i>Artemisia</i>) p. 131
29.	Leaflets with spine-tipped teeth on the margins.....	BERBERIDACEAE p. 61
29.	Leaflets without spine-tipped teeth on the margins.....	30
30.	Stems with spines or prickles.....	31
30.	Stems lacking spines or prickles.....	32
31.	Leaflets toothed or lobed.....	ROSACEAE p. 367
31.	Leaflets with entire margins.....	LEGUMINOSAE p. 262
32.	Leaflets mostly 3-7.....	33
32.	Leaflets mostly 9 or more.....	34
33.	Leaflets mostly 3.....	ANACARDIACEAE p. 57
33.	Leaflets mostly 5-7.....	ROSACEAE p. 367

34.	Flowers with 10 or fewer stamens; fruit densely reddish-hairy.....	ANACARDIACEAE p. 57
34.	Flowers usually with >10 stamens; fruit not reddish-hairy.....	ROSACEAE p. 367
35.	Plants with thorns, prickles, or spine-tipped branches.....	36
35.	Plants unarmed.....	42
36.	Leaves with entire margins.....	37
36.	Leaves with toothed or lobed margins.....	39
37.	Leaves silvery with hairs or scales on the lower surface.....	ELAEAGNACEAE (<i>Elaeagnus</i>) p. 223
37.	Leaves green on both surfaces.....	38
38.	Petals separate; stems angled and grooved.....	CELASTRACEAE (<i>Glossopetalon</i>) p. 108
38.	Petals united; stems more-or-less round in cross section.....	SOLANACEAE (<i>Lycium</i>) p. 443
39.	Leaves with 3-9 palmate (like a maple) lobes.....	40
39.	Leaves mostly not lobed.....	41
40.	Blades of many leaves >10 cm (4 in) long.....	ARALIACEAE p. 59
40.	Leaf blades mostly <8 cm (3 in) long.....	GROSSULARIACEAE p. 243
41.	Spines mostly branched, teeth of leaves tipped with a slender bristle.....	BERBERIDACEAE p. 61
41.	Spines not branched; teeth of leaves not bristle-tipped.....	ROSACEAE p. 367
42.	Leaves or their principle lobes <3 mm wide.....	43
42.	Leaves or their principle lobes >3 mm wide.....	49
43.	Leaves evergreen with 1 or 2 grooves beneath, resembling needles of a fir tree.....	ERICACEAE (<i>Phyllodoce</i>) p. 230
43.	Leaves not as above.....	44
44.	Leaves succulent, nearly round in cross section.....	CHENOPODIACEAE (<i>Suaeda</i>) p. 115
44.	Leaves not succulent, mostly flat.....	45
45.	Plants low and cushion-forming with grayish-hairy leaves.....	POLYGONACEAE (<i>Eriogonum</i>) p. 316
45.	Plants not as above.....	46
46.	Few to many flowers clustered in heads, each head surrounded by bracts forming a cup- or vase-shape, each cluster appearing like a single flower.....	COMPOSITAE p. 115
46.	Flowers not as above.....	47
47.	Male and female flowers borne in catkins on separate plants; shrubs of wet areas.....	SALICACEAE (<i>Salix</i>) p. 395
47.	Flowers bisexual; plants generally of dry habitats.....	48
48.	Plants prostrate or nearly so; flowers with united petals.....	POLEMONIACEAE (<i>Phlox</i>) p. 311
48.	Plants rarely prostrate; flowers with separate petals.....	ROSACEAE p. 367
49.	Leaf margins entire or nearly so.....	50
49.	Leaf margins toothed or lobed, sometimes only slightly so.....	58
50.	Leaves pale beneath with yellow, resinous dots.....	ERICACEAE (<i>Ledum</i>) p. 228
50.	Leaves not as above.....	51
51.	Male and female flowers borne in dense, cylindrical, spikelike inflorescences (catkins) on separate plants; shrubs of wet or moist habitats.....	SALICACEAE (<i>Salix</i>) p. 395
51.	Flowers bisexual.....	52
52.	Leaves all basal or with a whorl of leaves in the middle of the otherwise naked stem.....	POLYGONACEAE (<i>Eriogonum</i>) p. 316
52.	Stem leaves present and alternate.....	53
53.	Leaves covered with silvery scales, especially beneath.....	ELAEAGNACEAE (<i>Elaeagnus</i>) p. 223
53.	Leaves not covered with silvery scales.....	54
54.	Few to many flowers clustered in heads, each head surrounded by bracts forming a cup- or vase-shape, each cluster appearing like a single flower.....	COMPOSITAE p. 115
54.	Flowers not as above.....	55
55.	Flowers with >10 stamens.....	ROSACEAE p. 367
55.	Stamens 10 or fewer.....	56
56.	Inflorescence of numerous (>20) flowers; leaves paler beneath than above.....	RHAMNACEAE (<i>Ceanothus</i>) p. 367
56.	Inflorescence of fewer than 20 flowers.....	57

57.	Introduced shrubs of disturbed areas or riparian habitats in the valleys.....	SOLANACEAE p. 442
57.	Native plants mostly in forested areas in the mountains.....	ERICACEAE p. 224
58.	Many leaves with 3 lobes at the tip; crushed leaves with a sage odor.....	COMPOSITAE (<i>Artemisia</i>) p. 131
58.	Leaves not as above.....	59
59.	Plants alpine mostly <10 cm (4 in) tall.....	60
59.	Plants not as above.....	61
60.	Flowers bisexual with showy white petals.....	ROSACEAE (<i>Dryas</i>) p. 371
60.	Flowers unisexual and borne on separate plants; petals lacking.....	SALICACEAE (<i>Salix</i>) p. 395
61.	Flowers without petals and borne in dense, cylindrical, spikelike inflorescences (catkins).....	62
61.	Flowers not borne in catkins.....	63
62.	Catkins soft and somewhat fleshy, male and female catkins on separate plants.....	SALICACEAE p. 393
62.	Female catkins more brittle and conelike; male and female catkins borne on the same plant.....	BETULACEAE p. 62
63.	Trees.....	64
63.	Shrubs and subshrubs.....	65
64.	Flowers without petals; fruit a winged seed (samara).....	ULMACEAE p. 445
64.	Flowers with petals; fruit fleshy and berrylike or applelike.....	ROSACEAE p. 367
65.	Leaves palmately lobed (like a maple).....	66
65.	Leaves toothed but not palmately lobed.....	67
66.	Flowers with 5 stamens.....	GROSSULARIACEAE p. 243
66.	Flowers with >5 stamens.....	ROSACEAE p. 367
67.	Petals united at least at the base.....	68
67.	Petals separate.....	69
68.	Some leaves with 1 or 2 narrow lobes at the base.....	SOLANACEAE (<i>Solanum</i>) p. 443
68.	Leaves without lobes.....	ERICACEAE p. 224
69.	Flowers with 5 stamens.....	RHAMNACEAE p. 365
69.	Flowers with 10 or more stamens.....	ROSACEAE p. 367

GROUP IV

1.	Few to many flowers clustered in heads, each head surrounded by bracts forming a cup- or vase-shape, each cluster appearing like a single flower.....	2
1.	Flowers not as above.....	3
2.	Stamens 4; corolla 4-lobed.....	DIPSACACEAE p. 221
2.	Stamens 5; corolla mostly 5-lobed or with only 1 strap-shaped lobe.....	COMPOSITAE p. 115
3.	Plants parasitic on conifers; stems jointed; leaves reduced and scalelike.....	LORANTHACEAE p. 286
3.	Plants not as above.....	4
4.	Stems and leaves not green; leaves reduced to scales.....	ERICACEAE p. 224
4.	Plants with green leaves or stems.....	5
5.	Plants with milky sap; flowers consisting of a cup with 5 conspicuous lobes, stamens, and a 3-lobed, stalked ovary.....	EUPHORBACEAE p. 234
5.	Plants not as above.....	6
6.	Middle and lower leaves opposite or whorled (2 or more leaves per node).....	7
6.	Middle and lower leaves alternate or all basal or nearly so.....	17
7.	Plants with whorled leaves and sessile flowers in leaf axils; plants of wet to aquatic habitats.....	HIPPURIDACEAE p. 248
7.	Plants not as above.....	8
8.	Plants with sharp stinging hairs on the stems and leaves.....	URTICACEAE p. 459
8.	Plants not as above.....	9
9.	Middle stem leaves divided or lobed.....	10
9.	Middle stem leaves with entire, toothed or wavy margins.....	13
10.	Flowers small; flower parts green; introduced species of disturbed areas.....	11
10.	Flower parts colored or white; native species.....	12

11.	Leaves deeply 3-7 palmately lobed, plants usually twining.....	MORACEAE p. 291
11.	Leaves palmately divided into 5-9 leaflets; coarse annual herb.....	CANNABINACEAE p. 83
12.	Pistils and stamens numerous.....	RANUNCULACEAE p. 343
12.	Flowers with 1 pistil and 1-4 stamens.....	VALERIANACEAE p. 459
13.	Stamens and pistils >10 each.....	RANUNCULACEAE p. 343
13.	Stamens and pistils 10 or fewer each.....	14
14.	Leaves whorled (>2 per node).....	RUBIACEAE p. 390
14.	Leaves opposite (2 per node).....	15
15.	Petals absent and sepals green.....	CARYOPHYLLACEAE p. 88
15.	Colored (not green) petals present or sepals petallike and nongreen.....	16
16.	Plants perennial; flowers radially symmetrical; stamens mostly >4; stem leaves with short petioles.....	NYCTAGINACEAE p. 291
16.	Plants annual; flowers bilaterally symmetrical; stamens 3; stem leaves sessile....	VALERIANACEAE p. 459
17.	Plants vines with thin, curly tendrils for climbing.....	CUCURBITACEAE p. 221
17.	Plants not as above.....	18
18.	Flower 3-parted, reddish-purple, and laying on the ground; leaves spade-shaped and wider than long or nearly so.....	ARISTOLOCHIACEAE p. 61
18.	Plants not as above.....	19
19.	Leaves deeply lobed (>1/2 way to midvein) or divided.....	20
19.	Leaves with entire, toothed or wavy margins, not deeply lobed or divided.....	26
20.	Stamens >10 per flower.....	21
20.	Stamens 10 or fewer.....	22
21.	Plants with colored or milky sap; flowers with 1 pistil; introduced plants of disturbed areas.....	PAPAVERACEAE p. 305
21.	Plants with clear sap; flowers with numerous pistils; mostly native species.....	RANUNCULACEAE p. 343
22.	Flowers green, lacking colored petals; foliage usually fleshy.....	CHENOPODIACEAE (<i>Chenopodium</i>) p. 110
22.	Flowers with colored petals; foliage usually not fleshy.....	23
23.	Petals united, at least toward the base; flowers bilaterally symmetrical.....	FUMARIACEAE p. 237
23.	Petals separate; flowers radially symmetrical.....	24
24.	Flowers and fruits borne in a dense cylindrical spike.....	ROSACEAE (<i>Sibbaldia</i>) p. 387
24.	Inflorescence not as above.....	25
25.	Petals 4, attached at the base of the (superior) ovary.....	CRUCIFERAE (<i>Lepidium</i>) p. 212
25.	Petals 5, attached at the top of the (inferior) ovary.....	UMBELLIFERAE p. 445
26.	Stamens >10 in each flower.....	RANUNCULACEAE p. 343
26.	Stamens 10 or fewer.....	27
27.	Flowers bilaterally symmetrical, one of the sepals saclike.....	BALSAMINACEAE p. 61
27.	Flowers radially symmetrical, all of the petals or sepals similar in shape.....	28
28.	Flowers with 2-4 green sepals, color due entirely to the strongly exserted, purple stamens.....	SCROPHULARIACEAE (<i>Besseyia</i>) p. 419
28.	Flowers not as above.....	29
29.	Fruits disc-shaped and broadly elliptic to nearly round in outline with a notch at the top; annual plants often in disturbed soil.....	CRUCIFERAE (<i>Lepidium</i>) p. 212
29.	Fruits not as above.....	30
30.	Flower bracts or sepals with a spine-tip.....	AMARANTHACEAE p. 55
30.	Flower bracts and sepals lacking spine-tips.....	31
31.	Membranous appendages (stipules) sheathing the stems above attachment of petiole...	POLYGONACEAE p. 316
31.	Plants without sheathing stipules.....	32
32.	Fruit berrylike; leaves fleshy or leathery; plants rhizomatous.....	SANTALACEAE p. 404
32.	Plants not as above.....	33
33.	Flowers colored white, yellow, or pink.....	POLYGONACEAE (<i>Eriogonum</i>) p. 316
33.	Flowers green, sometimes tinged purple.....	34

34. Stamens 10; foliage not covered with silvery scales.....SAXIFRAGACEAE p. 404
 34. Stamens 2-6; foliage sometimes covered with silvery scales.....CHENOPODIACEAE p. 108

GROUP V

1. Flowers resembling a daisy or dandelion (these are not single flowers but actually clusters of flowers, each with united petals).....COMPOSITAE p. 115
1. Flowers not as above.....2
2. Flowers bilaterally symmetrical; petals not all the same shape and size.....3
2. Flowers radially symmetrical; petals all the same shape and size.....9
3. Flowers with >10 stamens.....RANUNCULACEAE p. 343
3. Flowers with 10 or fewer stamens.....4
4. Flowers with 4 petals.....5
4. Flowers with 5 petals.....6
5. Petals attached on top of the (inferior) ovary.....ONAGRACEAE p. 293
5. Petals attached at the base of the (superior) ovary.....FUMARIACEAE p. 237
6. Flowers with 5 stamens (violets).....VIOLACEAE p. 463
6. Flowers with 10 stamens.....7
7. Lower 2 petals united to form a canoe-shaped "keel" petal; flowers strongly bilaterally symmetrical, resembling those of a pea.....LEGUMINOSAE p. 262
7. Flowers not as above, petals nearly the same size and shape.....8
8. Petals attached at the base of the ovary.....ERICACEAE p. 224
8. A portion of the ovary below the point where petals are attached.....SAXIFRAGACEAE p. 404
9. Stems thick, fleshy, green, and spiny; leaves minute or lacking.....CACTACEAE p. 79
9. Plants not as above.....10
10. Flowers with 3 long sepals and 12 stamens, usually lying on the ground; leaves spade-shaped, at least as wide as long.....ARISTOLOCHACEAE p. 61
10. Plants not as above.....11
11. Flowers with >10 stamens.....12
11. Stamens 10 or fewer or absent.....21
12. Stem leaves opposite (2 per node).....13
12. Stem leaves alternate (1 per node) or clustered at the base.....14
13. Flowers with 4 small, white petals, sessile.....LYTHRACEAE p. 288
13. Petals yellow and usually 5; flowers borne on stalks.....HYPERICACEAE p. 252
14. Anther filaments fused into a tube that surrounds the style(s).....MALVACEAE p. 288
14. Stamens not fused into a tube.....15
15. Plants with white or colored sap; introduced plants of disturbed areas.....PAPAVERACEAE p. 305
15. Plants with clear sap.....16
16. Foliage covered with recurved hairs that cause it to stick to cloth like velcro.....LOASACEAE p. 286
16. Foliage not adhering to cloth like velcro.....17
17. Leaves divided into leaflets.....18
17. Leaves lobed or with entire or toothed margins but not divided into leaflets.....19
18. Sepals usually separate to the base, not united to the ovary.....RANUNCULACEAE p. 343
18. Basal part of sepals united to form a cup that is united to the lower portion of the ovary.....ROSACEAE p. 367
19. Flowers each with 1 pistil and 3-8 stigmas.....PORTULACACEAE p. 334
19. Flowers with >1 pistil.....20
20. Sepals usually separate to the base, not united to the ovary.....RANUNCULACEAE p. 343
20. Basal part of sepals united to form a cup that is united to the lower portion of the ovary.....ROSACEAE p. 367
21. Sepals, petals, and stamens appearing to arise from the top of the (inferior) ovary.....22
21. Sepals, petals, and stamens appearing to arise from the base of the (superior) ovary.....27

22.	Flowers with 2 or 4 petals, sepals, and stamens each.....	23
22.	Flowers with 5 petals and sepals and 5 or 10 stamens.....	24
23.	Clusters of flowers subtended by 4 white, petal-like bracts; fruit berrylike.....	CORNACEAE p. 190
23.	Flowers not subtended by petal-like bracts; fruit a nutlet or capsule.....	ONAGRACEAE p. 293
24.	Leaves divided or lobed at least 1/3-way to the midvein.....	25
24.	Leaves with entire or toothed margins, not lobed or divided.....	27
25.	Fruit fleshy and berrylike.....	ARALIACEAE p. 59
25.	Fruit dry, not berrylike.....	26
26.	Inflorescence umbrellalike, flowers borne on stalks joined at a common point.....	UMBELLIFERAE p. 445
26.	Inflorescence sometimes headlike but flowers not borne on stalks joined at a common point.....	SAXIFRAGACEAE p. 404
27.	Basal part of sepals united to form a cup that is joined to the lower portion of the ovary.....	28
27.	Sepals usually separate to the base, not united to the ovary.....	29
28.	Petals yellow.....	ROSACEAE p. 367
28.	Petals white or purplish.....	SAXIFRAGACEAE p. 404
29.	Styles >5 per flower.....	RANUNCULACEAE p. 343
29.	Styles 1-5 per flower or lacking.....	30
30.	Flowers with 2 or 3 sepals.....	31
30.	Flowers with 4 or 5 sepals.....	33
31.	Leaves pinnately divided or lobed.....	LIMNANTHACEAE p. 285
31.	Leaves with entire margins or with a pair of lobes at the base.....	32
32.	Petals white or pinkish.....	PORTULACACEAE p. 334
32.	Petals green or brownish.....	POLYGONACEAE p. 316
33.	Lower leaves divided into leaflets or at least >1/2-way to the midvein.....	34
33.	Lower leaves lobed less than 1/2-way to the midvein or with entire or toothed margins but not divided into leaflets.....	38
34.	Flowers with 4 petals.....	35
34.	Flowers with 5 petals.....	36
35.	Leaves with 3 leaflets.....	CAPPARIDACEAE p. 83
35.	Leaves not as above.....	CRUCIFERAE p. 194
36.	Leaves with 3 leaflets, each with a rounded notch at the tip.....	OXALIDACEAE p. 303
36.	Leaves not as above.....	37
37.	Sepals separate to the base.....	GERANIACEAE p. 240
37.	Sepals united at least below.....	SAXIFRAGACEAE p. 404
38.	Flowers with 4 petals.....	39
38.	Flowers with 5 petals.....	42
39.	Stems and leaves red, pink, white, or yellow but not green.....	ERICACEAE p. 224
39.	Stems and leaves green, at least in part.....	40
40.	Leaves alternate (1 per node) or all basal.....	CRUCIFERAE p. 194
40.	Leaves opposite or whorled (>1 per node).....	41
41.	Leaves fleshy, nearly round in cross section.....	CRASSULACEAE p. 192
41.	Leaves flat, not particularly fleshy.....	CARYOPHYLLACEAE p. 88
42.	Leaves fleshy; each flower with 4-5 ovaries that are separate or nearly so.....	CRASSULACEAE p. 192
42.	Plants not as above.....	43
43.	Flowers with only stamens.....	44
43.	Flowers bisexual.....	45
44.	Leaves fleshy; each flower with 4-5 separate ovaries that are separate or nearly so.....	CRASSULACEAE p. 192
44.	Leaves flat; each flower with a single ovary.....	CARYOPHYLLACEAE p. 88
45.	Leaves covered with long, reddish hairs tipped with sticky secretions that capture insects; plants of <u>Sphagnum</u> bogs.....	DROSERACEAE p. 223
45.	Plants not as above.....	46

46.	Leaves opposite or whorled (>1 per node).....	47
46.	Leaves alternate (1 per node) or all basal.....	48
47.	Leaves finely translucent-dotted (this feature can best be seen by holding a leaf up to the light and looking for numerous small "holes" in the blade).....	HYPERICACEAE p. 252
47.	Leaves without translucent dots.....	CARYOPHYLLACEAE p. 88
48.	Leaves deeply palmately lobed or divided; sepals separate to the base; fruits with a beak at least twice as long as the sepals.....	GERANIACEAE p. 240
48.	Plants not as above.....	49
49.	Leaves linear; flowers with 5 stamens.....	LINACEAE p. 285
49.	Plants not as above.....	50
50.	Flowers with 1 style and a shallowly 5-lobed ovary.....	ERICACEAE p. 224
50.	Flowers with 2 or more styles; ovary 2-lobed.....	SAXIFRAGACEAE p. 404

GROUP VI

1.	Few to many flowers clustered in heads, each head surrounded by bracts forming a cup- or vase-shape, each cluster appearing like a single flower; petals attached to top of the ovary.....	2
1.	Flowers not as above.....	3
2.	Flowers with 4 stamens and a 4-lobed corolla.....	DIPSACACEAE p. 221
2.	Flowers mostly with 5 stamens, usually with united anthers; corolla 1-, 2- or (mostly) 5-lobed, rarely 4-lobed.....	COMPOSITAE p. 115
3.	Plants with white, yellow, brown, pink, red, or purple stems and leaves; lacking green tissue.....	4
3.	Plants with green leaves and stems, at least in part.....	6
4.	Plants with orange, twining stems attached to foliage of other plants.....	CUSCUTACEAE p. 221
4.	Stems not twining, not attached to foliage of other plants.....	5
5.	Plants <12 cm (5 in) tall; corolla tubular and > 8 mm long.....	OROBANCHACEAE p. 301
5.	Plants mostly >15 (6 in) tall; corolla urn-shaped and 5-8 mm long.....	ERICACEAE (<i>Pterospora</i>) p. 227
6.	Stems thick, green, succulent, and spiny, covered with spines; leaves lacking or minute.....	CACTACEAE p. 79
6.	Plants not as above.....	7
7.	Plants with milky sap.....	8
7.	Plants with watery sap.....	9
8.	Corolla reflexed, each flower with 5 hornlike appendages surrounding the style....	ASCLEPIADACEAE p. 61
8.	Corolla bell-shaped to tubular.....	11
9.	Corolla attached on top of the ovary (inferior ovary).....	CAMPANULACEAE p. 80
9.	Corolla attached at the base of the ovary.....	10
10.	Plants erect with opposite leaves.....	APOCYNACEAE p. 57
10.	Plants twining; leaves alternate.....	CONVOLVULACEAE p. 190
11.	Flowers all unisexual; petals arising from base of ovary; stamens 10; leaves opposite (2 per node) and entire-margined.....	CARYOPHYLLACEAE p. 88
11.	Plants not as above.....	12
12.	Leaves undivided with entire margins; flowers radially symmetrical (petals all alike) with 2 sepals.....	PORTULACACEAE p. 334
12.	Plants not as above.....	13
13.	Anthers more numerous than petals or lobes of the corolla.....	14
13.	Anthers as numerous or fewer than petals or corolla lobes.....	24
14.	Flowers radially symmetrical (petals all the same size and shape).....	15
14.	Flowers bilaterally symmetrical (petals of different size or shape).....	21
15.	Leaves divided into leaflets.....	16
15.	Leaves lobed or with toothed to entire margins but not divided into leaflets.....	17
16.	Leaves divided into 3 leaflets like a shamrock.....	OXALIDACEAE p. 303
16.	Leaflets irregularly shaped, not like a shamrock.....	MALVACEAE p. 288

17.	Stamens numerous, united to form a tube that surrounds the style(s).....	MALVACEAE p. 288
17.	Stamens 10 or fewer, not united to form a tube.....	18
18.	Leaves fleshy and succulent.....	19
18.	Leaves more-or-less flat, not fleshy and succulent.....	20
19.	Sepals 2.....	PORTULACACEAE (<i>Portulaca</i>) p. 338
19.	Sepals mostly 5.....	CRASSULACEAE p. 192
20.	Leaves opposite (2 per node).....	CARYOPHYLLACEAE p. 88
20.	Leaves alternate (1 per node) or all basal.....	ERICACEAE p. 224
21.	Flowers with >10 stamens.....	RANUNCULACEAE p. 343
21.	Flowers with 10 or fewer stamens.....	22
22.	Flowers with 9-10 anthers.....	LEGUMINOSAE p. 262
22.	Flowers with 4-8 anthers.....	23
23.	Flowers with 6 anthers.....	FUMARIACEAE p. 237
23.	Flowers with 4 (or apparently 8) anthers.....	SCROPHULARIACEAE p. 417
24.	Ovary inferior (corolla attached at the top of the ovary).....	25
24.	Ovary superior (corolla attached at the base of the ovary).....	31
25.	Leaves opposite or whorled (>1 per node).....	26
25.	Leaves alternate (1 per node).....	29
26.	Leaves whorled (>2 per node) at least in part.....	RUBIACEAE p. 390
26.	Leaves opposite (2 per node).....	27
27.	Ovary and fruit with hooked hairs.....	RUBIACEAE p. 390
27.	Ovary and fruit lacking hooked hairs.....	28
28.	Flowers with 3 stamens.....	VALERIANACEAE p. 459
28.	Flowers with 4 stamens.....	CAPRIFOLIACEAE (<i>Linnaea</i>) p. 83
29.	Leaves divided into 3 leaflets; petals covered with short hairlike scales.....	MENYANTHACEAE p. 289
29.	Leaves with lobed to entire margins but not divided into leaflets.....	30
30.	Plants climbing vines with tendrils (curling modified stems or leaves).....	CUCURBITACEAE p. 221
30.	Plants not vines, tendrils lacking.....	CAMPANULACEAE p. 80
31.	Flowers bilaterally symmetrical (petals of different size or shape).....	32
31.	Flowers radially symmetrical (petals all the same size and shape).....	39
32.	Flowers with 5 anther-bearing stamens.....	33
32.	Flowers with 2-4 anther-bearing stamens.....	36
33.	Flowers yellow or orange.....	34
33.	Flowers not yellow or orange.....	35
34.	Plants with a cluster of leaves at the base as well as on the stem.....	SCROPHULARIACEAE (<i>Verbascum</i>) p. 437
34.	Plants with leaves only on the stem.....	BALSAMINACEAE p. 61
35.	Flowers usually bright blue; stamens exerted beyond the mouth of the corolla.....	BORAGINACEAE (<i>Echium</i>) p. 70
35.	Flowers pale with purple spots; stamens not protruding beyond the mouth of the corolla.....	SOLANACEAE (<i>Hyoscyamus</i>) p. 442
36.	Flowers with 3 stamens.....	VALERIANACEAE p. 459
36.	Stamens 2-4.....	37
37.	Ovary not 4-lobed; leaves alternate, opposite, or whorled; stems mostly not 4-angled.....	SCROPHULARIACEAE p. 417
37.	Ovary 4-lobed; leaves opposite (2 per node); stems 4-angled.....	38
38.	Anthers as long as or longer than their stalks; corolla nearly radially symmetrical, petals nearly the same size and shape.....	VERBENACEAE p. 461
38.	Anthers definitely shorter than their stalks; corolla often 2-lipped with the corolla lobes obviously of different sizes.....	LABIATAE p. 254

39.	Anther-bearing stamens 2-4, fewer than the lobes of the corolla.....	40
39.	Anther bearing stamens as many as corolla lobes or at least 5.....	48
40.	Flowers with 2 sepals; leaves with entire margins, often somewhat fleshy.....	PORTULACACEAE p. 334
40.	Plants not as above.....	41
41.	Flowers with 4 anther-bearing stamens.....	42
41.	Flowers with 2 or 3 anther-bearing stamens.....	44
42.	Ovary not 4-lobed; leaves alternate, opposite, or whorled; stems mostly not 4-angled.....	SCROPHULARIACEAE p. 417
42.	Ovary 4-lobed; leaves opposite (2 per node); stems 4-angled.....	43
43.	Anthers as long as or longer than their stalks.....	VERBENACEAE p. 461
43.	Anthers definitely shorter than their stalks.....	LABIATAE p. 254
44.	All leaves basal; petals thin and papery.....	PLANTAGINACEAE p. 305
44.	Plants mostly with leafy stems; petals not noticeably thin and papery.....	45
45.	Plants climbing vines with tendrils (curling modified stems or leaves).....	CUCURBITACEAE p. 221
45.	Plants not vines, tendrils lacking.....	46
46.	Flowers with 3 stamens.....	VALERIANACEAE p. 459
46.	Flowers with 2 stamens.....	47
47.	Fruit and ovary 4-lobed; flowers in dense clusters surrounding the stem just above where the leaves join.....	LABIATAE (<i>Lycopus</i>) p. 256
47.	Fruit and ovary not 4-lobed; inflorescence not as above.....	SCROPHULARIACEAE p. 417
48.	Flowers without an ovary.....	RUBIACEAE p. 390
48.	Flowers with an ovary.....	49
49.	Ovary 4-lobed or 4-grooved, splitting into 4 nutlets at maturity.....	50
49.	Ovary not 4-lobed or 4-grooved, not splitting in 4 at maturity.....	51
50.	Stamens 4, leaves opposite (2 per node).....	LABIATAE (<i>Mentha</i>) p. 258
50.	Stamens 5, leaves alternate (1 per node) at least in part.....	BORAGINACEAE p. 65
51.	Plants creeping and twining around adjacent vegetation; leaves arrowhead-shaped..	CONVOLVULACEAE p. 190
51.	Plants not as above.....	52
52.	Flowers with 2 sepals.....	PORTULACACEAE p. 334
52.	Flowers with >2 sepals.....	53
53.	Leaves opposite or whorled (>1 per node).....	54
53.	Leaves alternate or all basal.....	55
54.	Flowers with a 3-branched style (3 stigmas).....	POLEMONIACEAE p. 308
54.	Flowers with an unbranched style.....	GENTIANACEAE p. 237
55.	Flowers with 4 stamens; petals thin and papery.....	PLANTAGINACEAE p. 305
55.	Flowers not as above.....	56
56.	Flowers with a style that is 3-lobed at the tip.....	POLEMONIACEAE p. 308
56.	Flowers with an undivided or 2-lobed style.....	57
57.	Flowers with a style that is 2-lobed at the tip.....	58
57.	Flowers with a simple, unlobed style.....	59
58.	Sepals united at the base for <1/3 their length.....	HYDROPHYLLACEAE p. 249
58.	Sepals united for 1/2 their length or more.....	SOLANACEAE p. 442
59.	Stamens, or at least some of them, densely hairy.....	SCROPHULARIACEAE (<i>Verbascum</i>) p. 437
59.	Stamens not hairy.....	60
60.	Leaves all basal, flowers borne on naked stems.....	PRIMULACEAE p. 340
60.	Leafy stems present.....	61
61.	Sepals united at the base for 1/3 their length or less.....	PRIMULACEAE (<i>Lysimachia</i>) p. 340
61.	Sepals united for 1/2 their length or more.....	SOLANACEAE p. 442

ISOETACEAE

DIVISION LYCOPODIOPHYTA

CLUBMOSES AND ALLIES

ISOETACEAE Quillwort Family

Quillworts are perennial aquatic or amphibious herbs with simple, entire, onionlike leaves clustered on the 2- to 3-lobed rootstock. The leaves have a broadened base that bears 1 of 2 kinds of spores. The outermost and innermost leaves are often sterile. The outermost fertile leaves (sporophylls) bear pocketlike structures that contain the large spores (megasporeangia), while the microspores are borne on the inner fertile leaves.

Isoetes L. Quillwort

Members of the genus have the characters of the family. Identification of species requires microscopic examination of the megaspores.

1. Translucent margin of sporophylls extending more than 2 cm above the megasporeangium....(2) I. howellii
1. Translucent margin of sporophylls extending less than 2 cm above the megasporeangium.....2
2. Surface of megaspores with spines, plants usually in montane or lower subalpine zone, uncommon.....(3) I. echinospora
2. Surface of megaspores with bumps or short ridges, plants common in the upper subalpine and timberline zones.....(1) I. bolanderi

1. Isoetes bolanderi Engelm.

Bolander's Quillwort

This quillwort has leaves up to 10 cm (4 in) long that taper to a fine point. The translucent margin of the sporophylls does not extend more than 1 cm above the megasporeangia. The surface of the megaspores has bumps or short ridges.

Bolander's quillwort is common in shallow water along the margins of many lakes in the subalpine and timberline zones. It covers the lake bottom like a sod-forming grass on the east shore of Lost Horse Lake at 2170 m (7,125 ft). It also occurs in scattered colonies in some meltwater ponds that dry by late summer. B.C. to CA, east to Alta. and AZ.

2. Isoetes howellii Engelm.

Howell's Quillwort

[I. melanopoda Gay & Dur.]

Howell's quillwort has leaves that are often greater than 15 cm (6 in) long. The translucent margin of the sporophylls extends up to 5 cm (2 in) beyond the megasporeangia. The surface of the megaspores has bumps or low ridges.

This plant has been collected in South Kootenai Lake at 1910 m (6,255 ft). WA to CA, east to MT and UT.

3. Isoetes echinospora Dur.

Bristle-like Quillwort

[I. setacea Lam.]

The soft leaves of this species taper to a long, slender tip. The translucent margin of the sporophylls extends about 1 cm above the megasporeangium. The surface of the megaspores is covered with short or 2-pronged spines.

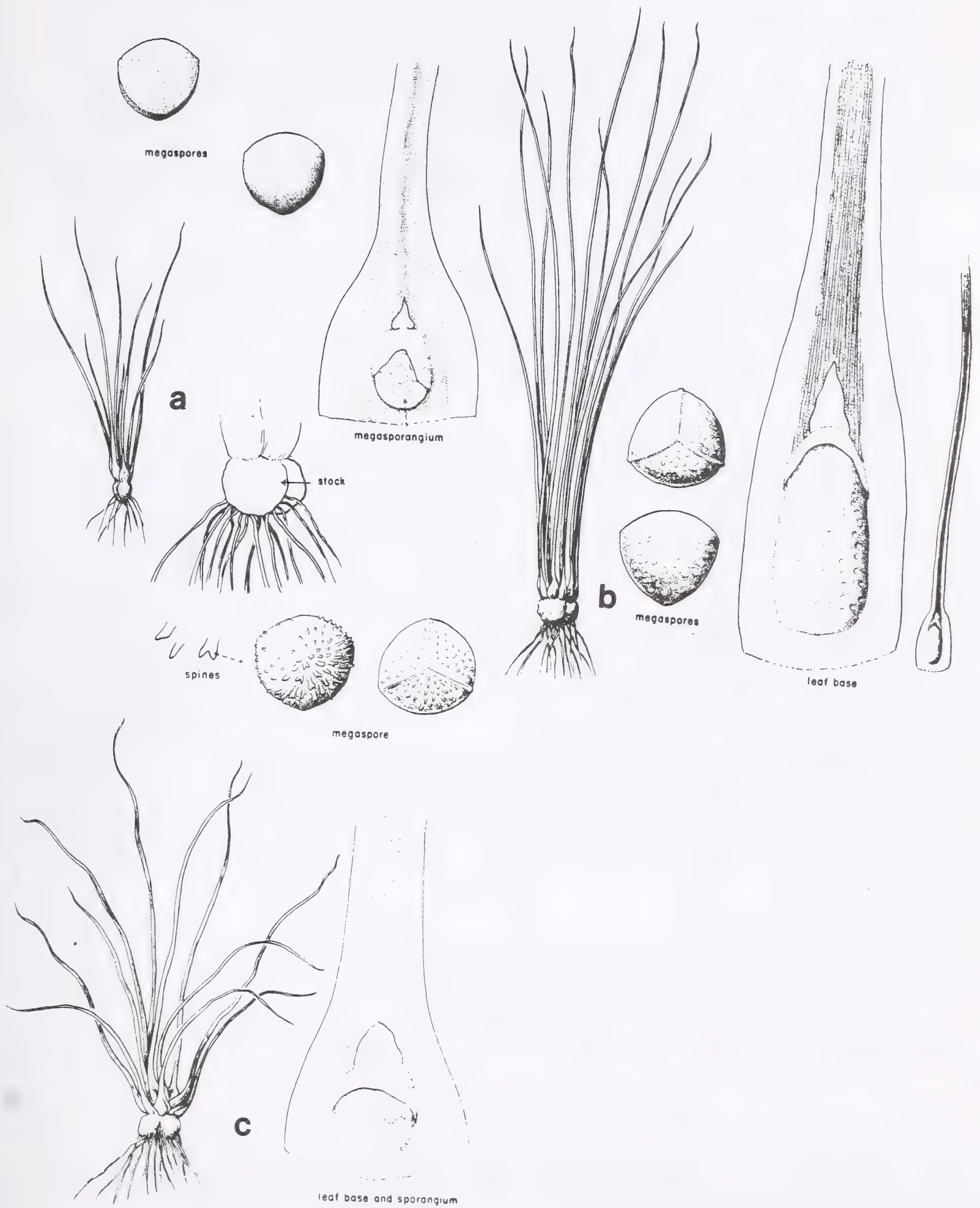
This species has been collected in Lower Twin Lake southwest of Hamilton in the Bitterroot Mountains. Circumboreal, south to CA, CO, MN, and NJ.

LYCOPODIACEAE Clubmoss Family

Clubmosses are low, mostly trailing, evergreen, perennial herbs that resemble large moss plants. The 1-nerved leaves are needlelike or scalelike, either alternate or opposite on the stem. The spore-bearing leaves (sporophylls) are similar to the vegetative leaves or are in clusters resembling cones at the end of erect stems.

Lycopodium L. Clubmoss

Members of the genus have the characters of the family. All of our species occur in cool, shaded habitats that have snow cover during the winter and relatively high humidity during the summer. They all have partly or wholly circumboreal distributions.



a. *Isoetes bolanderi* b. *I. howellii* c. *I. echinospora*

SELAGINELLACEAE

1. Spore-bearing leaves (sporophylls) similar to the vegetative leaves, not in a distinct terminal cluster.....(4) L. selago
1. Sporophylls clustered into distinct cones at the top of the stems.....2
2. Cones directly above the densely leafy stems, sparsely leafy stalk not present.....(1) L. annotinum
2. Cones elevated above the densely leafy branches on sparsely leafy stalks.....3
3. Horizontal stems densely leafy and similar to the erect stems.....(2) L. clavatum
3. Horizontal stems scaly or only sparsely leafy4
4. Aerial vegetative stems appearing flattened.....(3) L. complanatum
4. Aerial vegetative stems appearing to have whorls of ascending leaves.....(5) L. sitchense

1. Lycopodium annotinum L.

Stiff Clubmoss

The main stems of this species are prostrate or arching and give rise to erect, leafy branches that often divide and have elongated clusters (cones) of moderately differentiated fertile leaves at the tips. Vegetative leaves of the branches are 5-11 mm long and appear to be in whorls of 4 on the stem. The fertile leaves that form the cones are pale or greenish-brown.

Stiff clubmoss is common in moist forests of the lower creek bottoms in the montane and lower subalpine zones of the Bitterroot Mountains, often with Linnaea borealis, Cornus canadensis, Clintonia uniflora, Pyrola spp., and species of moss. Circumboreal, south to OR, CO, MN, and VA.

2. Lycopodium clavatum L.

Elk Moss

The main stems of elk moss are leafy and prostrate or arching, giving rise to more-or-less erect branches. The vegetative leaves are 3-8 mm long with a hairlike tip up to 2 mm long. Fertile leaves are borne in distinct cones at the end of well-differentiated stalks. They are light brown or greenish-brown, 2-3 mm long, and up to 3 mm wide.

This plant has been collected in moist forests along Lost Horse Creek and the East Fork of Lolo Creek in the montane and lower subalpine zones in the Bitterroot Mountains. Circumboreal, south to CA, MT, MI and NC.

3. Lycopodium complanatum L.

Ground Cedar

This species has scaly main stems that creep along or just below the ground surface. The freely branched, aerial stems appear flattened with narrow, appressed, scalelike leaves. The fertile leaves are borne in 1-3 distinct cones at the ends of well-defined scaly stalks.

Ground cedar is known only from moist lower subalpine forests along the East Fork of Lolo Creek and near Granite Creek west of Lolo. Circumboreal, south to WA and MT.

4. Lycopodium selago L.

Fir Clubmoss

Fir clubmoss has erect or ascending stems, usually less than 20 cm (8 in) tall, from a short underground base. The entire length of the stems is leafy. Fertile leaves are similar to the vegetative leaves and are borne in alternating zones. Thus, there are no distinct cones.

Locally common in moist subalpine fir forests and beneath alder in creek bottoms in the subalpine zones. It has also been collected beneath krummholz fir trees at timberline on the north slopes of the Heavenly Twins, west of Stevensville and Sugarloaf Peak, southwest of Darby. Circumboreal, south to OR, MT, and NC.

5. Lycopodium sitchense Rupr.

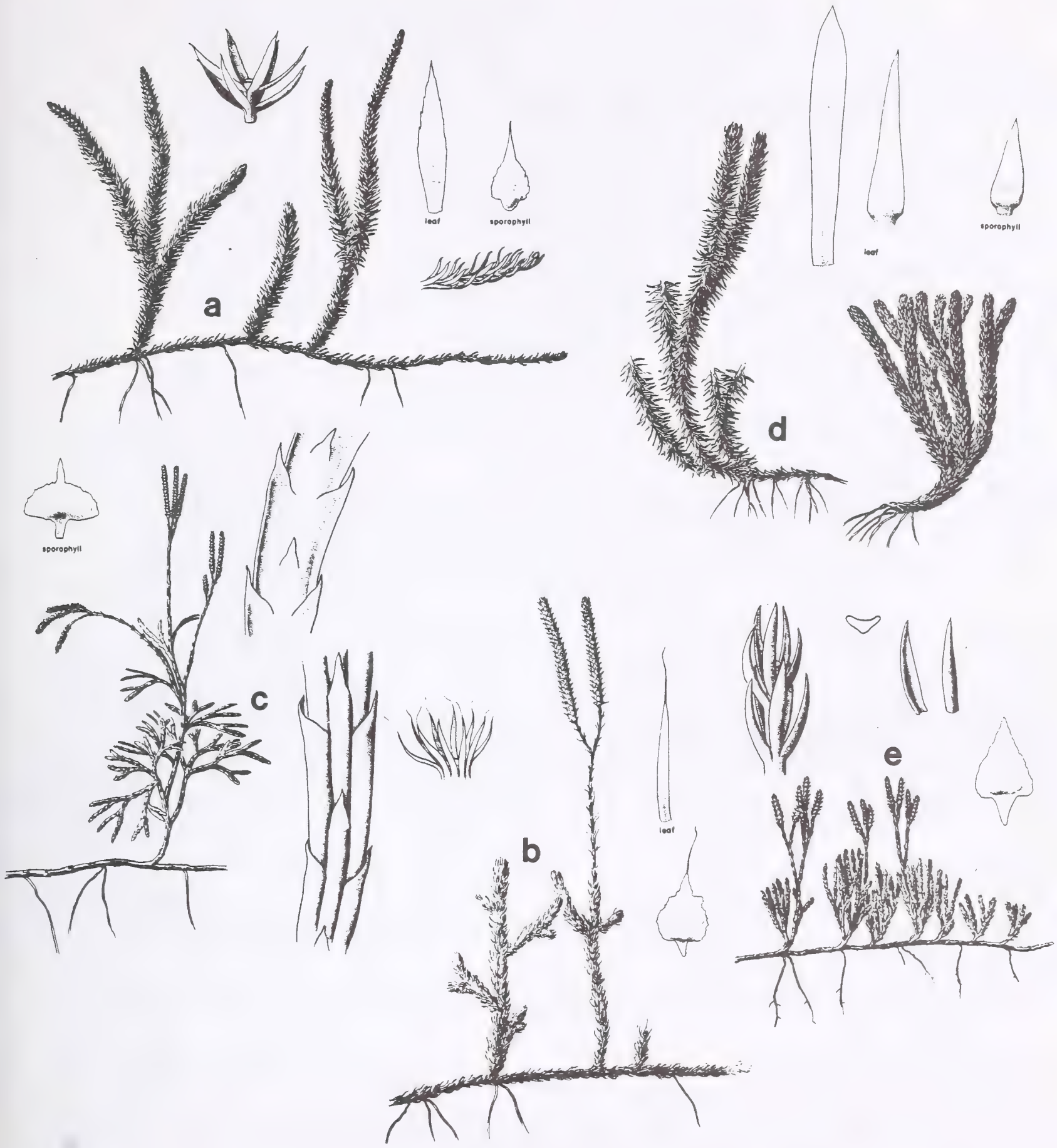
Alaskan Clubmoss

This species has sparsely leafy or scaly, horizontal stems that creep along the surface or just below the surface of the ground, giving rise to densely branched aerial stems. Vegetative leaves are mostly 2-3 mm long and less than 1 mm wide. The spore-bearing leaves are triangular and clustered at the ends of sparsely leafy stems, forming well-differentiated cones.

Alaskan clubmoss is known from moist meadows on the bank of Lower Twin Lake, southwest of Hamilton and Grizzly Lakes, west of Darby in the subalpine zones of the Bitterroot Mountains. Boreal in North America and Asia, south in w. U.S. to OR and MT.

SELLAGINELLACEAE Lesser Clubmoss Family

Plants in this family are trailing, evergreen herbs with branched, leafy stems, rooting from the points of branching. The small leaves are overlapping and are different shades of green depending on the plant's state of hydration. The spore-bearing leaves (sporophylls), which are clustered in cones (strobili) at the ends of branches, are not greatly differentiated from the vegetative leaves. The spores are borne at the base of the sporophylls.



a. *Lycopodium annotinum* b. *L. clavatum* c. *L. complanatum* d. *L. selago* e. *L. sitchense*

EQUISETACEAE

Selaginella Beauv. Lesser Clubmoss

Members of this genus have the characteristics of the family. They are low and mat-forming and resemble mosses.

1. Stems loosely branched, not forming dense cushion-like mats.....(2) S. wallacei
1. Stems closely branched, usually forming cushion-like mats.....(1) S. densa

1. Selaginella densa Rydb.

Compact Clubmoss

Plants are low-growing and compactly branched, forming cushionlike mats. The leaves are crowded and appressed to the stem. They are up to 2.5 mm long and taper to a terminal bristle. The cones are 4-sided. Sporophylls are similar to the vegetative leaves but are wider and have a shorter bristle-tip.

The two varieties of this species in our area are difficult to distinguish. Var. scopulorum (Maxon) Tryon has sporophylls with entire margins, at least towards the tip. It is abundant in dry, exposed habitats from the valley to the alpine zone throughout our range. Var. densa has sporophylls with minutely toothed margins all the way to the tip. It is less common in similar habitats from the valley to the timberline zone throughout our area. AK to CA, east to the Great Plains.

2. Selaginella wallacei Hieron.

Wallace's Lesser Clubmoss

This species has stems up to 20 cm (8 in) long. It is loosely branched and does not form dense cushions. The branches are longer and set farther apart than in S. densa. The leaves are up to 2.5 mm long and are tipped with a short bristle. The cones are 4-sided. The sporophylls are similar to the vegetative leaves but are slightly wider and have a keel on the back.

Wallace's lesser clubmoss occurs in open to more often partially shaded habitats in the montane and subalpine zones. It requires more humid and protected habitats than S. densa. It is locally common along the entire east front of the Bitterroot Mountains. B.C. to CA, east to Alta. and MT.

DIVISION SPHENOPHYTA

HORSETAILS

EQUISETACEAE Horsetail Family

Plants in this family are perennial herbs with rhizomes and dark-colored rootstocks. The stems have conspicuous nodes and are longitudinally grooved. The evergreen or annual stems are hollow and simple or with whorls of branches at the nodes. The leaves are scalelike, often dark-colored, and united to form a sheath at each node. The top of the sheath is divided into dark-colored teeth. The spores are borne in a terminal cone (strobilus).

Equisetum L. Horsetail, Scouring Rush

Members of this genus have the characters of the family. With the exception of E. laevigatum, all our species have a circumboreal distribution.

In addition to the following species, E. X ferrisii Clute (a hybrid between E. hyemale and E. laevigatum) and E. X nelsonii (A.A. Eat.) Schaffn. (a hybrid between E. variegatum and E. laevigatum) have been collected in the Bitterroot Valley. They appear to be rare, but little is known of their distribution in our area.

1. Plants without regularly whorled branches.....2
1. Plants with regularly whorled branches on the green stems.....6
2. Leaf sheaths usually with 3 teeth; stems up to 1 mm in diameter; moist spruce forests.....(8) E. scirpoides
2. Leaf sheaths with more than 3 teeth; stems usually more than 1 mm in diameter; various habitats.....3
3. Teeth of leaf sheaths soon deciduous, sheaths then with a scalloped margin.....(3) E. laevigatum
3. Teeth of leaf sheaths persistent.....4
4. Cones (strobili) blunt on top, without a terminal point.....(4) E. fluviatile
4. Cones pointed at the top.....5
5. Stems greater than 4 mm in diameter with 14-40 longitudinal ridges.....(6) E. hyemale
5. Stems less than 3 mm in diameter with 3-12 longitudinal ridges.....(7) E. variegatum
6. Whorled branches branched again; teeth of leaf sheaths united into 2-5 lobes.....(2) E. sylvaticum
6. Whorled branches simple; teeth of leaf sheaths not united into lobes.....7

7. Central cavity of the stem large, $\frac{4}{5}$ the diameter of the outside of the stem.....(4) E. fluviatile
 7. Central cavity of stem mostly less than $\frac{2}{3}$ the diameter of the outside of the stem.....8
8. Central cavity of the stem less than $\frac{1}{3}$ diameter of the outside of the stem; branches with a small central cavity, rare.....(5) E. palustre
 8. Central cavity of the stem greater than $\frac{1}{3}$ diameter of the outside of the stem; branches without a central cavity, common.....(1) E. arvense

Group I. The first group contains 2 species with annual stems. The cones are borne on brownish stems distinctly different from the green, photosynthetic, sterile stems.

1. Equisetum arvense L.

Common Horsetail

Common horsetail has erect or decumbent, annual vegetative stems, up to 60 cm (2 ft) long, with numerous, whorled, mostly simple branches at the nodes. The teeth of the nodal sheaths are 1-3 mm long, brown or black, and persistent. Cone-bearing stems are light brown and up to 30 cm (1 ft) tall. The blunt-tipped cones are borne on a stalk. Fertile stems are present only early in the season.

Common in moist to wet, open or partially shaded habitats from the valley to the timberline zone throughout our area. It is the only horsetail occurring at high elevations in our area. In the Bitterroot Mountains, it has been collected at 2620 m (8,600 ft) above Chaffin Creek, west of Darby, and at 2500 m (8,200 ft) above Carlton Lakes, west of Lolo. Cosmopolitan.

E. arvense is our most common horsetail. It often becomes an obnoxious weed in cultivated soils.

2. Equisetum sylvaticum L.

Wood Horsetail

This horsetail has erect, annual vegetative stems up to 50 cm (20 in) tall with whorls of branches that are themselves branched. The leaf sheaths are green, becoming brown with age. The teeth are united into 3-4 light brown, membranous lobes. Cone-bearing stems are light brown and simple at first but become branched and photosynthetic with age. Cones are blunt-tipped on long stalks.

In our area, wood horsetail is known only from the upper West Fork of Lolo Creek, west of Lolo. Circumboreal, south to B.C., ID, MT, SD, and KY.

Group II. The second group contains species with fertile and sterile stems that are similar in appearance.

3. Equisetum laevigatum A. Br.

Smooth Scouring Rush

This species has simple or sparsely branched, clustered stems up to 80 cm (32 in) tall. Stems have mostly 16-30 longitudinal ridges. The leaf sheaths are mainly green. The teeth are black, less than 2 mm long, and quickly deciduous, leaving only the dark bases at the top of the sheaths. Cones have only a short stalk and are rounded, sometimes with a short, pointed tip.

Smooth scouring rush is common in shallow water and wet soil in the valley zone throughout our area. It is often found in disturbed habitats, such as roadside ditches. B.C. to Baja Cal. Ca., east to the Great Plains.

4. Equisetum fluviatile L.

Swamp Horsetail

Swamp horsetail has erect, simple or branched stems up to 1 m (3 ft) tall. Stems have 9-25 longitudinal ridges. The leaf sheaths are green with black teeth up to 3 mm long. Cones are blunt-tipped with a short, sturdy stalk.

This species is common in standing water of lakes and along streams or wet soils of boggy habitats from the valley to the lower subalpine zone. It occurs in many sloughs along the Bitterroot River and has been collected at 1900 m (6,230 ft) in Lower Kidney Lake southwest of Hamilton. Circumboreal, south to WA, WY, MN, and PA.

5. Equisetum palustre L.

Marsh Horsetail

This plant has densely branched, erect stems up to 45 cm (18 in) tall, the branches simple and ascending. The stems have 5-10 longitudinal ridges. Leaf sheaths are green with persistent, white-margined teeth, 3-7 mm long. The sterile stems are without branches at the top. Fertile stems are terminated by 2-3 branchless nodes topped by a blunt-tipped cone.

In our area this species was collected in moist, partly shaded soil along Hughs Creek, south of Darby at 1340 m (4,400 ft). It could be confused with E. arvense and is probably more common than collections indicate. Circumboreal, south to WA, MT, NE, and PA.

The dark, clasping sheaths of the rootstocks are a good diagnostic character for this species.

Group III. The third group consists of species with perennial, evergreen stems in which both the fertile and sterile stems are alike.



a. *Selaginella densa* b. *S. wallacei* c. *Equisetum arvense* d. *E. sylvaticum*

6. Equisetum hyemale L.

Common Scouring Rush

Common scouring rush has dark green, unbranched stems up to 1.5 m (5 ft) tall, single or clustered on branched rhizomes. The stems have 18-40 longitudinal ridges. Leaf sheaths are black-banded at the tip and in the middle. The slender teeth are 2-4 mm long. The sharp-pointed cones have only a short stalk.

This species is common in moist meadows and forests in the valley and montane zones throughout our area. Its upper distributional limit coincides with that of black cottonwood (Populus trichocarpa). Circumboreal, south through CA and FL.

7. Equisetum variegatum Schleich.

Variegated Horsetail

This species has erect or ascending stems, up to 30 cm (1 ft) tall, that are branched from the base and appear tufted. The stems have 5-12 longitudinal ridges. Sheaths are green with a black band at the top. The distinctly white-margined teeth are up to 2 mm long and tipped with a deciduous, hairlike bristle. The small, sharp-pointed cones have a short stalk.

Variegated horsetail is common in more-or-less calcareous, wet meadows in the subalpine zones of the Sapphire Range. It is uncommon in the valley zone and does not occur in the Bitterroot Mountains. Circumboreal, south to WA, UT, IL, and PA.

Our plants are var. variegatum.

8. Equisetum scirpoides Michx.

Sedgelike Horsetail

The dark green stems of this species are slender and flexuous. They are branched from near the base, prostrate to ascending, and up to 15 cm (6 in) long. The stems have 6 longitudinal grooves. The sheaths are short with a green base and black tips. The 3-4 triangular teeth are 1-2 mm long and white-margined.

Sedgelike horsetail is known only from one location in a moist, lower subalpine forest in the Skalkaho Basin, east of Hamilton at 1460 m (4,800 ft).

DIVISION PTEROPHYTA

FERNS AND FERN ALLIES

MARSILEACEAE Pepperwort Family

Plants in the Pepperwort Family are herbs with alternate leaves arising from superficial rhizomes. Spores are borne in hair-covered, egg-shaped capsules (sporocarps). Species are aquatic or semiaquatic.

Marsilea L. PepperwortMarsilea vestita Hook. & Grev.

Common Pepperwort

Leaves of common pepperwort arise singly or more often in tufts from a horizontal rhizome. The submersed, emergent or floating leaves are borne on a slender petiole, 2-15 mm long. The blades are composed of four leaflets and resemble a 4-leaf clover. Spore capsules arise singly on short stalks from the nodes of the rhizome.

Uncommon but locally abundant in ditches along Hwy. 93 in the Bitterroot Valley and north of Missoula. B.C. to CA, east to MN. AK and Mex.

OPHIOGLOSSACEAE Adder's-tongue Family

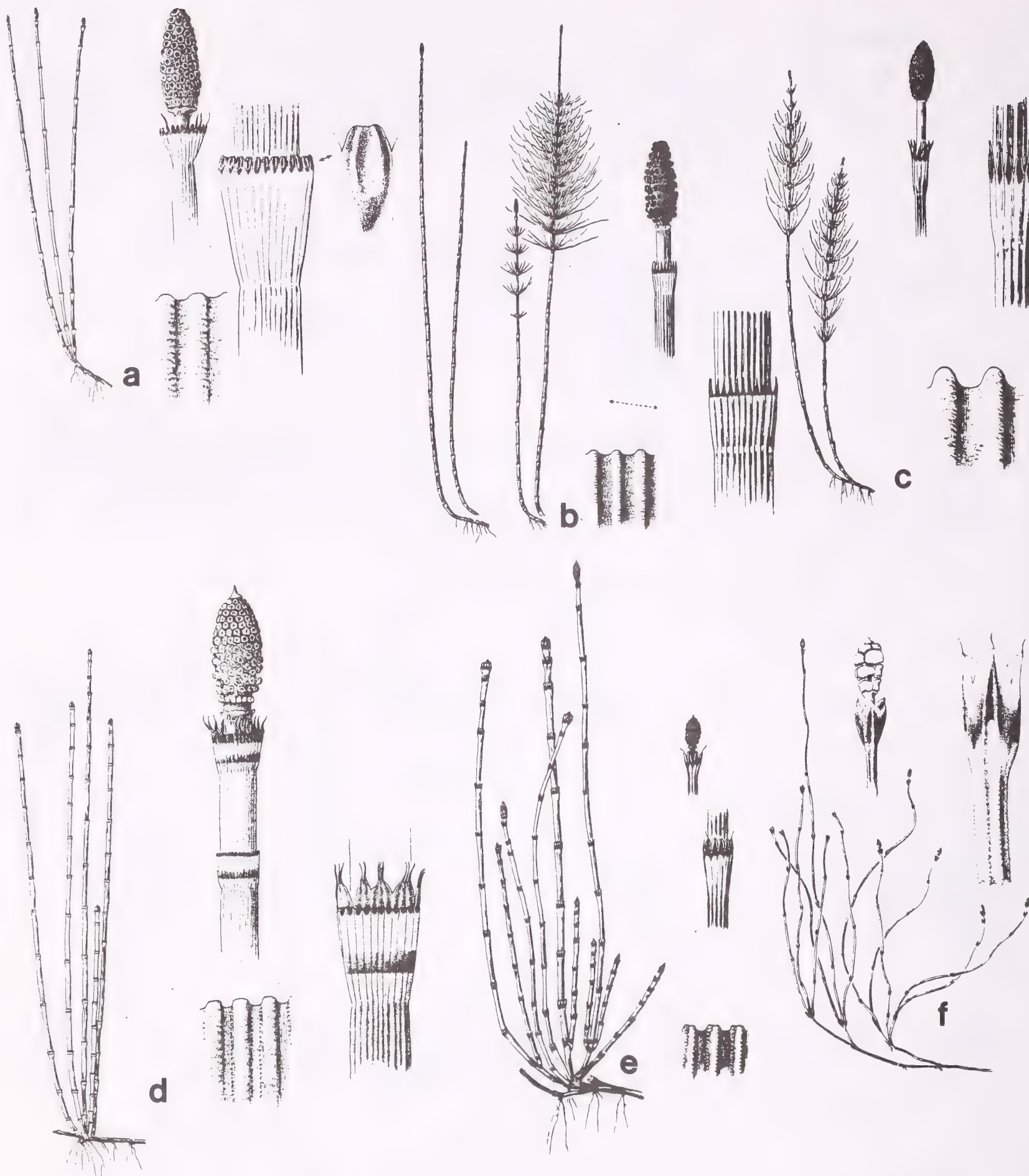
Members of this family are perennial herbs from short, erect rootstocks and few to several coarse roots. Generally only one fleshy, glabrous leaf is produced each year. The leaves consist of a fertile and sterile segment united below into a common stalk. The sterile blade is entire or more commonly lobed or 1-3 times pinnately divided. The spores are enclosed in numerous, round sporangia borne on the simple or branched fertile spike (fertile leaf segment).

Botrychium Sw. Grape Fern

Members of the genus have the characters of the family. Our species have lobed or 1-4 times pinnately dissected sterile blades and branched fertile spikes with numerous sporangia, bearing a vague resemblance to bunches of grapes.

All our species have a circumboreal distribution.

1. Sterile blade once pinnate; plants usually less than 10 cm (4 in) tall.....2
1. Sterile blade 2-4 times pinnately divided; plants usually greater than 10 cm tall.....3



a. *Equisetum laevigatum* b. *E. fluviatile* c. *E. palustre* d. *E. hyemale* e. *E. variegatum*
f. *Equisetum scirpoides*

2. Sterile blade attached at or near ground level, the lowest pair of lobes deeply divided again.....(3) B. simplex
2. Sterile blade attached well above the ground level, the lowest pair of lobes only shallowly divided.....(4) B. lunaria
3. Sterile blade longer than wide and usually < 6 cm long.....(5) B. boreale
3. Sterile blade usually as wide as long and > 8 cm long.....4
4. Sterile blade attached at or near ground level; ultimate leaf segments rounded.....(2) B. multifidum
4. Sterile blade attached well above ground level; ultimate leaf segments pointed.....(1) B. virginianum

Group I. The first group contains two species, usually well over 10 cm (4 in) tall.

1. Botrychium virginianum (L.) Swartz

Rattlesnake Fern, Virginia Grape Fern

These plants have annual leaves 10-30 cm (4-12 in) tall. The sterile blade is 2-4 times pinnately divided with pointed ultimate segments that are triangular in outline and 7-20 cm (3-8 in) long. It branches from the main stem well above the ground with or without a short petiole. The fertile stalk is longer than the sterile blade. The terminal fertile spike is usually branched, often twice pinnate.

Rattlesnake fern is widely scattered but locally common in moist to fairly dry, open forests, mostly in the montane zone. South to WA, ID, and MT and at scattered stations to Mex.

2. Botrychium multifidum (Gmel.) Trevis.

Evergreen Grape Fern

This species has deep green, leathery, evergreen leaves up to 30 cm (12 in) tall. The sterile blade is broadly triangular in outline, 4-20 cm (2-8 in) long, and 3 times pinnately divided with rounded ultimate segments and a long petiole. The sterile blade branches near ground level. The fertile blade is 5-15 cm (2-6 in) long and 2-3 times pinnately branched.

Evergreen grape fern is infrequent in open to partially shaded, moist to wet habitats such as meadows, open forests near streams and aspen groves, mainly in the montane and lower subalpine zones. Circumboreal, south to CA, WY, IA, and NC.

Group II. The second group contains small species, usually not over 10 cm (4 in) tall. These species are easily overlooked and may be more common than our few collections indicate.

3. Botrychium simplex E. Hitch.

Little Grape Fern

Little grape fern is generally 3-10 cm (2-4 in) tall with the sterile blade attached to the common stem at or near ground level. The nearly sessile sterile blade is usually about 6 cm (2 in) long, and pinnately divided, the lowest pair of lobes are lobed again and usually larger than the others. The fertile blade is 2-8 cm (1-3 in) long, and the fruiting spike is simple or, more often, compound.

This species has been collected at 2350 m (7,700 ft) on East St. Joseph Peak, west of Stevensville and in the Rattlesnake Mountains north of Missoula. B.C. to Newf., south to CA, NM, IA, and VA.

4. Botrychium lunaria (L.) Swartz

Moonwort

Moonwort species usually has the sterile blade attached to the common stem well above ground level. The sterile blade has a short petiole and is divided into 3-6 pairs of overlapping, fan-shaped lobes. The fertile stalk is usually longer than the sterile blade and has a simply branched fruiting spike.

In our area, moonwort has been collected near the head of Gray Horse Creek and above Coffee Gulch Road in the Sapphire Range. Our plants are var. lunaria. Occurs also in the Southern Hemisphere.

5. Botrychium boreale Milde.

Northern Grape Fern

[B. pinnatum St. John]

Northern grape fern is 3-15 cm (1-6 in) tall with the erect sterile blade attached above the middle of the plant. The oblong or egg-shaped sterile blade is sessile or nearly so and up to 5 cm (2 in) long. It is divided into 3-6 pairs of fleshy, rounded lobes, the lowest pinnately divided. The fertile blade is erect and 1-6 cm long. Occasional plants have 2 fertile blades.

This grape fern occurs in well-drained but moist habitats on cool slopes in the montane and subalpine zones. It has been collected above Coffee Gulch, southeast of Hamilton. AK to OR, east to MT and NV; Europe and Asia.

POLYPODIACEAE Common Fern Family

True ferns are leafy perennials from creeping, underground rootstocks (rhizomes). Leaves (fronds) are spaced or clustered along the rootstock, each unfurling from a crooklike shape (fiddlehead). Vegetative and fertile leaves may be alike, or the fertile leaves are longer and have narrower segments. Petioles (stipe) and stem (rhizome) are often covered with scales (thin membranous appendages resembling



a. *Marsilea vestita* b. *Botrychium multifidum* c. *B. virginianum* d. *B. simplex* e. *B. lunaria* f. *B. boreale*

fish or reptile scales). Leaves are simple to several times pinnately divided. Spore-cases (sporangia) are minute, stalked, spore-discharging structures grouped in round to elongated clusters called sori. These are naked or more usually covered with a delicate flap (indusium) or reflexed leaf margin (for those sori borne at leaf margin).

1. Sori near leaflet margins, appearing elongated and at least partially covered by the inrolled or reflexed margins (lower leaf surface rarely densely covered by long, woolly hairs).....2
1. Sori borne on along veins between leaflet or segment margin and its midrib (costa); sori in outline mostly round but occasionally elongated; leaflet margins flat, rarely rolled.....7
2. Ultimate fertile leaflets have mucronate (small, tooth-like) tip.....Aspidotis
2. Ultimate fertile leaflets lacking a mucronate tip.....3
3. Leaves of 2 kinds; the fertile mostly longer than the vegetative and having inrolled margins.....Cryptogramma
3. Leaves mostly alike.....4
4. Sori discontinuous, covered by reflexed tips of leaflet margins; leaflets glabrous.....Adiantum
4. Sori continuous around the margins of leaflets, covered by rolled margins; leaflets often hairy.....5
5. Leaves over 25 cm (10 in) tall dispersed along a rhizome; often forming large colonies.....Pteridium
5. Leaves < 25 cm (10 in) tall densely clustered (often in rock crevices).....Cheilanthes
6. Sori elongated (minute, use hand lens) to crescent shaped in outline.....Athyrium
6. Sori round in outline.....7
7. Indusia (coverings to sori) present.....8
7. Indusia lacking.....11
8. Indusia mostly under the sori and divided into throat-like segments or else covering the sori from below like hoods.....9
8. Indusia mostly above the sori, round or horseshoe-shaped in outline.....10
9. Indusia attached at center of sori cluster and divided into narrow, spreading segments; leaves clustered and their bases remaining persistent on rootstock.....Woodsia
9. Indusia attached to side of sori cluster and covering them like hoods which are reflexed at maturity; leaves scattered or small clusters and petiole bases not persistent.....Cystopteris
10. Indusia with a cleft on one side; leaves at least twice divided.....Dryopteris
10. Indusia lacking a cleft; leaves once or sometimes twice divided.....Polystichum
11. Leaves simple or once divided.....Polypodium
11. Leaves at least twice divided.....Gymnocarpium

Adiantum L. Maidenhair Fern

Adiantum pedatum L.

Maidenhair Fern

Leaves with shining purple-black petioles are all alike, arising singly or in loose clusters from a short rootstock. They are fan- to kidney-shaped in outline and oriented horizontally. Leaf blades are divided into two recurving parts, each consisting of 3-6 leaflets (pinnae) which are dissected into 15-40 ultimate leaflets (pinnules). Sori are borne on and covered by reflexed pinnule margins.

Maidenhair fern is known from three subalpine zone locations on the Selway-Bitterroot Divide and one large population of very small plants, about 15 cm (6 in) tall, in a boulder field above Kerlee Lake, elevations 2135 to 2285 m (7,000 to 7,500 ft). All occurrences are associated with perennial seeps. It is notable that these populations are at the eastern extreme of this species' distribution and occupy habitats quite different from those inhabited in the center of the range. Widespread in temperate woodlands of North America and e. Asia.

Aspidotis (Nutt.) Copel. Podfern

Aspidotis densa (Brackenr.) Lellinger

Podfern

Leaves of podfern are 15-18 cm (6-7 in) long and of two forms. Both forms are glabrous, densely tufted, and originate from a short, much branched, rhizome with persistent, glossy-brown petiole bases. Three-times pinnately divided and egg-shaped to triangular in outline, the blades of sterile leaves (sometimes missing) are much shorter and broader than those of fertile ones. Fertile leaves are distinctly more numerous and have petioles much longer than the 3-times divided, egg-shaped to oblong blades. The linear to lance-shaped ultimate leaf segments are numerous and crowded with reflexed, whitish, membranous

margins covering two continuous and parallel lines of sori.

Podfern is locally common in the Bitterroot Mountains, mostly on moist, stabilized slides or in fissures of granitic bedrock. It also occurs in the Rattlesnake Mountains. From s. B.C. to CA east to e. OR, n. ID, nw. MT and disjunct in UT, Ont. and Que.

Athyrium Roth Lady Fern

Medium to large in stature, lady-ferns have succulent, straw-colored, tightly tufted, erect to ascending stalks growing from scaly, short rootstocks. The yellowish-green, 2-4 times pinnately divided leaves curve gracefully outward.

1. Indusium crescent-shaped and frayed on the margin; smallest veinlets clearly visible from below; leaves widest at midpoint, tapering to either end.....(1) A. filix-femina
1. Indusium lacking; veinlets mostly obscure viewed from below; leaves widest at the base, tapering to tip.....(2) A. distentifolium

1. Athyrium filix-femina (L.) Roth

Common Lady Fern

Arranged in a fountainlike formation, the 20-150 cm (8-60 in) long leaves of the common lady fern are 2-3 times pinnately divided and taper at both ends. Dense, blackish scales occur on the lower stem as well as leaves in the budding stage. Elongated, crescent-shaped indusia cover the sori. Veinlets that terminate at the sori are obvious on undersides of the unstalked, toothed pinnules with 10x magnification.

This species is found from valley riparian environments to the subalpine zone from very moist to the wettest of forest and non-forest habitats. Distribution is circumboreal and nearly cosmopolitan.

In the fall this is the first fern to succumb to frost; it is also the only fern in our range to occasionally have insect damage.

2. Athyrium distentifolium Tausch [A. alpestre (Hoppe) Clairev.]

Alpine Lady Fern

Leaves of alpine lady fern are smaller, and the ultimate leaf segments are more finely dissected or lobed and set further apart on the lower end of the pinnae than those of A. filix-femina. Pinnule venation is obscure. Sori that lack an indusium are located in the sinus of the pinnules' incisions.

Alpine lady-fern becomes increasingly common toward the Selway-Bitterroot Divide and occurs throughout the range at elevations greater than 2135 m (7,000 ft) to over 2740 m (9,000 ft) on north- and east-facing slopes. It is associated with boulder or scree slopes near late-thawing snowbanks. Our plants are var. americanum (Butters) Cronq. Circumboreal, south in w. North America to CA, NV and CO.

Where it occurs in dense populations without competing vegetation of similar size, alpine lady-fern forms an impressive display. One such display can be seen on Bare Peak southwest of Darby.

Cheilanthes Sw. Lip Fern

Fertile and sterile leaves of these small ferns are alike and usually no more than 12 cm (5 in) long. Firm, tufted leaves arise from a branched rootstock with dark brown scales and many persistent petiole bases. Petioles are dark, slender and wiry. The central leaf axis (rachis) is also dark and brittle. Blades are usually hairy or scaly and 2-4 times pinnately divided. Sori are borne at the end of forked veins and at least partially covered by reflexed pinnule (ultimate leaf segment) margins.

These small, attractive, evergreen ferns grow in dry, rocky sites, shriveling and losing their color in drought periods; they quickly recover following rain.

1. Leaf undersides both long-hairy and scaly, obscuring the surface; ultimate leaf segments about 2 times longer than wide.....(1) C. gracillima
1. Leaf undersides hairy, not scaly, surface easily visible; ultimate leaf segments about as long as wide.....(2) C. feei

1. Cheilanthes gracillima D.C. Eat.

Lace Lip Fern

Leaves are slender with narrowly lance-shaped blades and oblong to triangular pinnae that are set apart below and crowded above. Ultimate pinnules are only 1-3 mm long. The rachis and its divisions are set (mostly on underside) with narrow brown scales and white to rusty-brown, long hairs.

Lace lip fern is common in the Bitterroot Mountains but infrequent in the other two mountain ranges. It is found in fissures of granitic bedrock from montane canyons to timberline, to 2530 m (8,300 ft) on E. St. Joseph Peak. From s. B.C. to s. CA, east to central ID, and nw. MT.

2. Cheilanthes feei Moore

Fee's Lip Fern

Fee's lip fern is closely similar to Cheilanthes gracillima. The lance-shaped to egg-shaped leaf blades, though scaleless, are so densely covered with long, tawny hairs on their underside that the surface is obscured. The upper surface is merely sparsely long-hairy.



a. *Adiantum pedatum* b. *Aspidotis densa* c. *Athyrium filix-femina* d. *A. distentifolium*
e. *Cheilanthes gracillima*

POLYPODIACEAE

Fee's lip fern is rare and in our area found only on calcareous substrates. There is one collection from the Rattlesnake Range. B.C. and Alta. to IL and WI, south to TX and n. Mex.

Exposure to sun and wind causes leaves to be almost continuously inrolled.

Cryptogramma R. Br. Rock-brake

Cryptogramma crista (L.) R. Br.
[C. acrostichoides R. Br.]

Rock-brake, Parsley Fern

Light to yellowish-green, sterile leaves, less than 20 cm (8 in) tall, arise from a short, densely branched rootstock beset with scales and old petiole-bases. Sterile blades are 3 times pinnately divided and egg-shaped to oblong in outline. Ultimate leaflets (pinnules) are oblong with rounded teeth. The erect fertile leaves, distinctly different from the sterile ones, have petioles as long as the sterile leaves and blades 5-15 cm (2-6 in) long. Fertile blades are 2-3 times pinnately divided and have linear to oblong ultimate leaflets and reflexed margins covering the sporangia.

Widespread and common in our area, this fern occurs from montane canyons to protected sites in the alpine zone, usually growing in vernal moist rock crevices and scree slopes. Interruptedly circumboreal, in North America throughout the western mountains.

Cystopteris Bernh. Bladder Fern

Cystopteris fragilis (L.) Bernh.

Brittle Bladder Fern

Thin, and glabrous to weakly glandular leaves, to 25 cm (10 in) long, stand erect, bunched or scattered, the larger ones arching. Petioles that are dark brown and brittle below and straw-colored to green above are shorter than the blade and originate from creeping, branched and densely brown-scaly rootstocks. Leaf blades are lance-shaped in outline and 2-3 times pinnately divided, with pinnae in nearly opposite pairs set well apart on the lower rachis and more crowded and reduced toward the summit. The outline of the pinnae and shape of the ultimate leaflets is quite variable. The indusium is thin, somewhat hoodlike, its free lip arched over, but only incompletely covering the sorus.

Brittle bladder fern is perhaps the most common of all our ferns. It has a broad ecological amplitude, ranging from river valleys to alpine summits. Habitats are at least vernal moist but well-drained and have various degrees of wind protection and shade. Widespread in the Northern Hemisphere.

This fern may dry up as early as mid-July but early fall rains often initiate new growth.

Dryopteris Adans. Shield Fern, Wood Fern

Wood ferns are medium to tall species of moist and at least semi-shaded environments. The semi-evergreen to deciduous leaves, 2-3 times pinnately divided, arise from a short, sturdy rootstock that is set with chaffy scales and the persistent petiole bases of previous years. The indusium is round or broadly spade-shaped. The sori are borne at the end of veins on both sides of the pinnules' (ultimate leaflets) midrib. Distribution of all three species is circumboreal.

1. Leaf blades roughly triangular, widest near the base; blades divided 3 times.....(1) D. austriaca
1. Leaf blades elliptic in outline, widest near the middle; blades mostly 2 times divided.....2
2. Leaves twice pinnately divided; midrib of pinnae extended into narrow and inconspicuously foliar-like wing (<1.5 mm).....(2) D. filix-mas
2. Leaves not quite twice divided (compound); midrib of pinnae broader (2.5 to 5 mm).....(3) D. cristata

1. Dryopteris austriaca (Jacq.) Woynar
[D. dilatata (Hoffm.) Gray]

Mountain Wood Fern

The triangular to elongated leaves are 2-3 times pinnately divided, widest at the base (excellent field character), and up to 70 cm (28 in) long (one 1/2 of which is scaly petiole). The pinnules pointing toward the leaf base are evidently longer than those pointing toward the tip.

This fern requires more moisture than most other ferns of our area. It is typically found on rotten, moss-covered wood. It is locally common in montane to subalpine zones and has been collected at timberline. Circumboreal and extending south. in North America to n. CA and nw. WY.

Leaves are semi-evergreen, lasting through the winter, but pressed down and broken by snow.

2. Dryopteris filix-mas (L.) Schott

Male Fern

Male fern is the tallest (blades alone to 1 m (40 in)) and sturdiest fern of this genus. Leaves clustered on short rootstocks have petioles with coarse, dense, brown scales and dark green, twice pinnately divided, elongated blades that are widest at midpoint and taper toward both ends. Midribs of the pinnae have a narrow margin of leaflike texture. Pinnules are blunt-tipped and very finely serrate.

This species is widespread but not common in the Bitterroot Mountains. It more frequently occurs in moist to wet forests and riparian areas in the subalpine zone than at lower elevations but ranges to

timberline sites. Circumboreal extending south in North America to OR, n. ID, nw. MT, and sporadically to AZ and NM.

3. Dryopteris cristata (L.) Gray

Crested Shield Fern

Crested shield fern has two nearly distinct leaf forms; the deciduous fertile ones (with sori) are more erect, larger, and longer stemmed than the evergreen sterile ones. The pinnae are incised but not sufficiently deep to create pinnules; thus, in aspect, this species is less dissected ("lacy") than other Dryopteris spp. Each pinnae has a wide, leaflike midrib. Longest pinnae are near the middle of the leaf blade.

Crested shield fern rarely occurs in our area; one collection is recorded from the sw. Bitterroot Mountains and one from the Rattlesnake drainage. Circumboreal, extending south in Am. to n. ID, nw. MT, AR, and NC.

Gymnocarpium Newm. Oak Fern

Gymnocarpium dryopteris (L.) Newm.

Oak Fern

Oak fern is small and delicate. The light green, deciduous leaf blades have petioles 10-30 cm (4-12 in) long, and are oriented parallel to the ground. Arising singly and scattered along an elongated, slender and creeping rootstock, the basally scaly petioles are smooth above with a dark purple-brown to black sheen. The glabrous to slightly glandular blade is broadly triangular in outline and distinctively divided into 3 triangular leaflets that are 1-2 times pinnately divided into paired asymmetric pinnae, the basal pair of which is evidently the largest.

Oak-fern is locally common and indicative of moist to wet forests of the montane to lower subalpine zones. It also occurs in shrubby riparian stringers. It does well in shade so deep that most other undergrowth species cannot exist. Though locally common in the northern Bitterroot Mountains, ground blanketing populations do not occur as they do in more favorable environments on the Idaho side of the Divide. This species also frequently occurs in the Rattlesnake and Sapphire Mountains. Circumboreal and extending south at appropriate elevations to OR, AZ, IA, and VA.

Polypodium L. Polypody

Polypodium hesperium L.

Common Polypody

[P. vulgare L.]

The short, less than 20 cm (8 in) long, glabrous, evergreen leaves of common polypody originate at short intervals from a thick, densely scaly rootstock. The firm, leathery, dark green blade is somewhat longer than the smooth petiole. It is broadly lance-shaped in outline, and divided into elongated, round-tipped, entire to weakly-toothed leaflets with confluent, sessile bases. Two rows of large, naked sori run parallel to the midrib.

In the Bitterroot Mountains, polypody occurs on montane, shaded, primarily east-facing slopes in relatively dry crevices of granitic or metamorphic substrates. These habitats are apparently drier than those in mountains to the west and north. Between Big Creek and Bear Creek, there are four large populations at elevations ranging from 1615 to 1980 m (5,300 to 6,500 ft); a lone population exists at Lost Horse Creek Observation Pt. Yuk. and interior AK, south to OR, n. ID, MT, and irregularly to Baja Cal., AZ, and NM.

Polystichum Roth Holly Fern, Sword Fern, Christmas Fern

These ferns have evergreen leaves clustered on a short, vertical rhizome. Leaves have scaly petioles and blades that are 1-2 times pinnately divided into numerous toothed or lobed segments. The sori are borne in rows on the veins on either side of the midnerve. The membranous indusium arises from the center of the sori.

1. Leaves only once divided, the leaflets incised less than halfway to midrib.....2
1. Leaves twice divided, or if once compound, then incised more than halfway to midrib.....3
2. Lowest several pinnae progressively reduced; spiny teeth of pinnae more or less strongly spreading or ascending-spreading.....(1) P. lonchites
2. Lowest several pinnae not much reduced; spiny pinnae teeth appressed or closely ascending.....(2) P. munitum
3. Lower and middle primary leaflets incised more than halfway to the midrib for much of their length; leaves mostly more than 35 cm (14 in) long.....(3) P. andersonii
3. Only near base of lower and middle primary are leaflets incised more than halfway to the midrib; leaves mostly less than 35 cm (14 in) long.....(4) P. scopulinum



f. *Cheilanthes feei* g. *Cryptogramma crispera* h. *Cystopteris fragilis* i. *Dryopteris austriaca*
j. *Dryopteris filix-mas* k. *D. cristata* l. *Gymnocarpium dryopteris*

1. Polystichum lonchitis (L.) Roth

Mountain Holly Fern

Mountain holly fern has very short petioles, the lowest pinnae reach almost to the rachis base. The blades are oblong or linear lance-shaped and widest near the middle. The length of the blades (including the petiole) is 10-50 cm (4-20 in). Stiff, dark green, undivided pinnae have prominent teeth set with minute spines and are gradually reduced toward the blade base. The lowest pinnae are roughly triangular. Indusia with toothed margins cover the sori borne on pinnae of the middle and upper blade.

This attractive circumboreal fern is the most common Polystichum in our area. It is found in the Bitterroot Mountains from Lolo Peak south to Watchtower Peak and becomes increasingly better represented toward the Selway-Bitterroot Divide. Across its broad elevational range, 1830 to 2640 m (6,000 to 8,650 ft), its size decreases with increasing elevation and varies with the nature of the habitat, from moist, steep, shaded and forested slopes to boulder fields and cliff crevices. Circumboreal, south in North America to Que., Ont., n. MI, sw. MT, central ID, and nw. WA., and irregularly to CO, UT, ne. NV, and n. CA.

2. Polystichum munitum (Kaulf.) Presl

Common Christmas Fern, Western Sword Fern

The densely tufted leaves of this fern, 30-60 cm (12-24 in) long, ascend and arch outward. The petiole is much longer than that of P. lonchitis and is covered with reddish-brown scales that extend up the underside of the rachis. The dark green blade is lance-shaped in outline, and the lower pinnae are slightly shortened. The undivided and finely serrate pinnae are asymmetrical at the base, the upper side having a prominent basal tooth. The conspicuous indusia have margins with a fringe of coarse hairs.

Western sword fern has been recorded from Bear Creek in the Bitterroot Mountains and Sleeping Child Hot Springs in the Sapphire Range. It has been collected so exhaustively at Charles Waters Memorial Campgrounds that the population was extirpated. It is always found on moist, forested sites; the elevation range is 1065 to 1525 m (3,500 to 5,000 ft). This species is predominantly a coastal species from AK to Baja Cal., including the Cascades and extending east to n. ID and nw. MT.

3. Polystichum andersonii Hopkins

Anderson's Sword Fern

Compared to the two previously cited species, Anderson's sword fern has softer and more "lacy" appearing leaves (due to being twice pinnately dissected). The petiole and rachis are densely scaly throughout. The leaves are 30-50 cm (12-20 in) long with blades that are broadly lance-shaped in outline and evidently narrowed toward both ends. The deeply pinnately dissected pinnae are lance-shaped (lowermost triangular) and well separated along the rachis; their segments (pinnules) are finely serrate and set with minute spines. One or more scaly buds set in the axil of the pinnae are a unique identifying feature.

Single plants or small colonies of this attractive fern occur infrequently on north- and east-facing slopes of the Bitterroot Mountains, usually in moist Engelmann spruce/subalpine fir forests having an undergrowth of Menziesia ferruginea and Rhododendron albiflorum. This species is also found along streambanks, avalanche chutes, and shrub thickets. For example, between South Kootenai Lake and the Heavenly Twins there is an extensive population in association with Dryopteris filix-mas, and D. austriaca in an alder thicket. From s. AK to B.C., n. ID, nw. MT and south to n. OR.

4. Polystichum scopulinum (D.C. Eat.) Maxon

Rock Sword Fern

Leaves of rock sword fern are 10-30 cm (4-12 in) long. The upper portion of the leaves resembles P. lonchitis in color and outline but differs by having longer petioles with only the lower half densely scaly and the lower pinnae set apart on the rachis and deeply cut into 1-3 pairs of lobes. Only the middle to upper pinnae have sori that are covered by indusia with toothed margins.

This is the rarest fern of this group with only one collection from a moist, shaded cliff crevice at 2195 m (7,200 ft) on the lower south slope of St. Joseph Peak in the Bitterroot Mountains. From s. B.C. to s. CA, and east to central ID and n. UT.

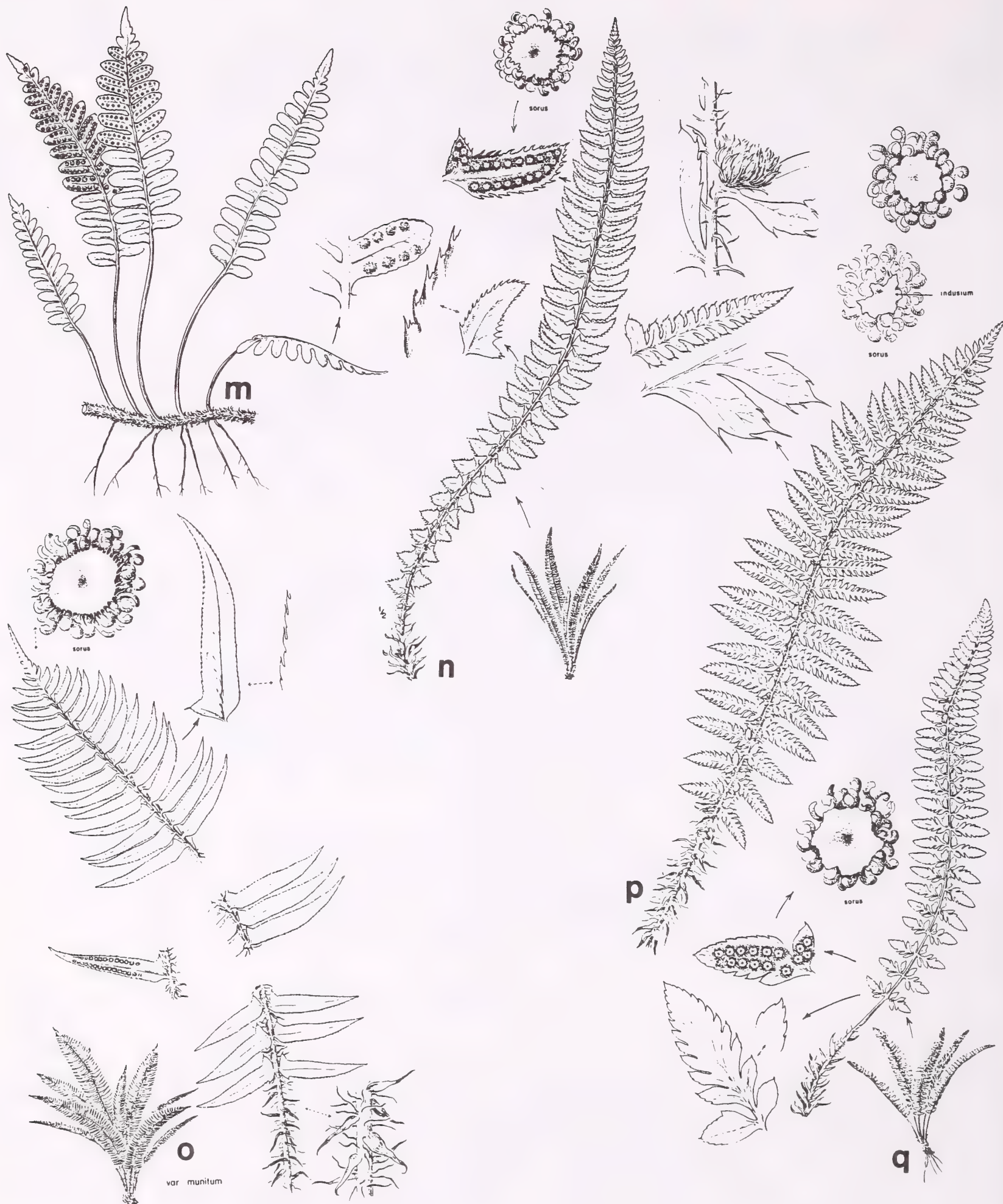
Pteridium Gled. Bracken FernPteridium aquilinum (L.) Kuhn

Bracken Fern

With heights reaching 1 m (40 in) or more, bracken is our most robust and vigorous fern. It grows from highly branched, deep-seated rhizomes. The large, solitary, deciduous leaves have broadly triangular to egg-shaped, horizontally oriented blades that are divided into 3 nearly equal pinnae. Sori are continuously distributed along the pinnules' margins and covered by folded-over leaflet edges.

Bracken is locally common to abundant at lower to mid-elevations; however, an elevational disjunct occurs at 2425 m (7,950 ft) above Chaffin Lakes. Cosmopolitan.

Dense populations may be established after disturbance, particularly following fire. Populations are drastically reduced on forested sites as the forest begins to close. Dense populations inhibit establishment of trees and other vegetation, and it is poisonous to livestock.



m. *Polypodium hesperium* n. *Polystichum lonchitis* o. *P. munitum* p. *P. andersonii* q. *P. scopulinum*

Woodsia R.Br. Woodsia

Ferns of this genus are small to medium-sized, with light green leaves that wither early. Rootstocks are set with numerous prominent and persistent dark petiole remnants of different lengths and yellowish to dark brown scales. Leaves are ascending to erect and arching with lance-shaped blades that are 2-3 times pinnately divided. Pinnae are triangular to oblong in outline and their length is reduced towards both ends of the rachis. Teeth of the pinnules are directed outward and rounded at the apex. Indusia of hairs or segmented discs cover the sori which are located over the pinnule veins.

The following two Woodsia species are similar in appearance, usually less than 20 cm (8 in) tall, and widespread in various dry habitats (in direct sun or shade), mostly on scree/talus slopes or in cliff crevices from the montane to the subalpine zone.

These woodsias (especially W. oregana) are easily confused with Cystopteris fragilis which lacks conspicuous, persistent petioles and has crescent-shaped, hooded indusia.

1. Leaf blades glabrous or with only glands.....(1) W. oregana
1. Leaf blades with both glands and septate hairs.....(2) W. scopulina

1. Woodsia scopulina D.C. Eat.

Rocky Mountain Woodsia

The pinnae of Rocky Mountain woodsia are more lance-shaped than those of W. oregana, and the underside of the blade is studded with both flattened, white, partitioned hairs and glands set on slender, short stalks.

Cordilleran species, from AK to Alta. and east irregularly to Que. and s. Appalachian Mountains, south to s. CA and NM.

2. Woodsia oregana D.C. Eat.

Woodsia

The pinnae of this species tend to be triangular to elongated-triangular (not lance-shaped). The undersides of the blade lack hairs but are set with scattered short-stalked glands.

See habitat description above; a cordilleran species from B.C. and Alta. south to s. CA and NM and with isolated occurrences in e. U.S. and Can.

DIVISION CONIFEROPHYTA

CONIFERS

CUPRESSACEAE Cedar Family

1. Branches rather bushy, not flattened; bearing bumpy bluish berry-like, pea-sized fruits; shrubs or small trees.....2
1. Branches flattened, spray-like; bearing small, woody cones; large forest trees.....(3) Thuja plicata
2. Awl- or needle-like leaves arranged in threes; shrubs mostly decumbent.....(1) Juniperus communis
2. Tiny scale-like leaves opposite in pairs; plants erect and >2 m tall.....(2) Juniperus scopulorum

Juniperus L. Juniper

This genus includes aromatic, dioecious evergreen shrubs and small trees. Leaves of the various species are linear, from scalelike to needlelike. Male cones are small, inconspicuous and borne alone at branch tips. The roundish and berrylike female fruiting bodies have 1-3 seeds and are composed of 2-several fleshy scales with a waxy bloom.

1. Juniperus communis L.

Common Juniper

Common juniper is a low, evergreen shrub 15-100 cm (6-40 in) tall. Robust forms have numerous depressed and decumbent branches. Circular patches form and occasionally die-back at the center resulting in ringlike patches. Arranged in whorls of 3, leaves are rigid, sharp-pointed, needlelike, and about 1 cm long, with a whitish central stripe on the upper surface. Male cones are axillary, while female cones are borne terminally, mature during the second season, and persist through the following winter.

This common shrub occurs sparsely in all vegetation zones, but in our area may be abundant on dry, exposed sites at middle and upper elevations. Even above timberline a given plant may survive for centuries. Ours is the variety montana Ait. It has many growth forms and is found in diverse habitats throughout northern North America and Eurasia.

Fruits are consumed in the winter by waxwings and solitaires.



r. *Pteridium aquilinum* s. *Woodsia scopulina* t. *W. oregana*

2. Juniperus scopulorum Sarg.

Rocky Mountain Juniper

This juniper is an erect shrub or small tree, up to 6 m (20 ft) in our area, with yellowish to bluish-green, intensely aromatic foliage (like that of cedar) and thin, shredding bark. Tree growth form is compactly elongate-cylindrical to conical. The seedling and young shoots bear awl-shaped, rigid, sharp-pointed, and spreading leaves; those borne on more mature growth are small, scalelike, and appressed to the twig. The pea-sized, berrylike, bluish-purple fruits are covered by a whitish bloom and contain 1-2 seeds.

This shrubby tree is most common in dry or rocky sites at lower elevations (lower timberline) where it has little competition from other conifers. It occurs throughout most of the Interior West from the Mexican border to s. B.C. and Alta.

Thuja L. ArborvitaeThuja plicata Donn.

Western Redcedar

Western redcedar is one of the largest conifers in the Northwestern U.S., but generally only up to 30 m (100 ft) in our area, the eastern limit of its range. The bole flares strongly at the base in fluted root buttresses. Bark is thin, stringy (peeling in strips), cinnamon red when young and gray on older trees. The low-density wood is soft, reddish-brown, and fragrant. The root system is shallow and wide spreading. Foliage is drooping, strongly flattened and lacelike. The yellowish-green scalelike leaves are arranged in overlapping pairs; the upper and lower are flattened, and the lateral ones are keeled, resulting in the characteristic spraylike foliage. Trees have both male and female cones. The tiny cones (female ones to 1 cm long) consist of several pairs of brown spine-tipped scales. Seeds are small, 6-7 mm long, with paired lateral wings.

Though strongly shade-tolerant, this tree is intolerant of low soil moisture. In our area it is restricted to a few watercourses and ravines. Researchers have found that in favorable environments T. plicata may live a thousand years. It was widely used among native American tribes for making shelter, ropes, tools, canoes, and clothing. AK to CA, n. ID, and w. MT.

PINACEAE Pine Family

Our representatives of this family are woody, resinous trees with evergreen or deciduous needlelike leaves and both male and female cones on the same tree. Male cones are small, soft, and deciduous after pollen shedding; female cones are more robust with woody, spirally arranged scales bearing the seeds on their upper surface. Both winged and non-winged seeds have evolved depending on the reproductive strategy of the species.

1. Leaves needlelike (more than 1.25 cm, 0.5 in long).....2
1. Leaves scaly, tiny, pressed against twigs or spreading but short and awllike....See Cupressaceae above
2. Needles evergreen, relatively hard or tough; if clustered, <6 per cluster.....4
2. Needles deciduous each fall, soft (lax); most borne in small dense clusters.....3
3. Current year's growth (tips of branches) with woolly hairs (tomentum); timberline tree.....(3) Larix lyallii
3. Current year's twigs with few or no hairs; straight, tall tree not near timberline.....(4) Larix occidentalis
4. Needles attached in "bundles" (fascicles) of 2,3, or 5 (pines).....5
4. Needles singly attached to twigs.....8
5. Needles 2 to a bundle; about 5 cm (2 in) long; cones about 3-5 cm (1.5-2 in) long.....(7) Pinus contorta
5. Needles mostly more than 2 per bundle; cones more than 6 cm (2.5 in) long.....6
6. Needles mostly in bundles of 3; cones 8-13 cm (3-8 in) long.....(6) Pinus ponderosa
6. Needles mostly in bundles of 5.....7
7. Mature cones purple-brown, about 8 cm (3 in) long, remaining on tree unless animal harvested; needles yellowish-green, stout and rigid, 4-8 cm (1.5-3 in) long; of high elevation, especially near timberline.....(8) Pinus albicaulis
7. Mature cones deciduous, tan-brown, 15-25 cm (6-10 in) long; needles bluish-green, slender and flexible tree montane and lower subalpine zones (rare in our area).....(9) Pinus monticola
8. Twigs of the current year remain green; needles flat with slender, abruptly narrowed points; fruit small, red and berry-like..... see Taxaceae below
8. Twigs of current year turning brown; needles not as above; female reproductive structure a cone.....9



a. *Thuja plicata* b. *Juniperus communis* c. *J. scopulorum*

9. Cones with three-pronged bracts between and projecting beyond the cone scales; buds sharp-pointed; needles pointed but not prickly to the touch.....(10) *Pseudotsuga menziesii*
9. Cones lacking three-pronged bracts; buds not sharp-pointed; needles either blunt or prickly.....10
10. Young branches rough or warty where the needles have been shed; needle fall leaves a small woody base; cones not erect and not confined to the uppermost branches.....11
10. Young branches smooth after needle fall; needles fall off at the base leaving round scars; cones borne erect in uppermost branches, disintegrating there leaving upright woody axis.....12
11. Needles stiff, prickly to the touch, giving off a pungent odor when crushed; bark with loose surface scales; tip of crown upright.....(5) *Picea engelmannii*
11. Needles blunt and not stiff, not giving off odor; bark rough but not scaling off; tip of mature crown nodding.....(11) *Tsuga mertensiana*
12. Needles generally 3-5 cm (1.25-2 in) long, 2-ranked (needles spreading in horizontal plane, leaving upper side of twigs bare).....(1) *Abies grandis*
12. Needles mostly less than 2.5 cm (1 in) long, turning upward and not confined to horizontal plane.....(2) *Abies lasiocarpa*

Abies Mill. Fir

Firs are tall, evergreen trees with the bark of immature stems having "resin blisters." The needlelike leaves are linear, 2-5 cm (1-2 in) long, flattened, and blunt-tipped. Male cones are small and pendant from the lower side of branchlets near mid-crown. At the top of the crown, female (seed) cones are borne erect at the tips of last season's growth. When these cones have ripened in the autumn of the first season, they disintegrate leaving an upright, persistent, bare central axis.

1. Abies grandis (Dougl.) Lindl.

Grand Fir

In west-central MT this tree is up to 40 m (130 ft) tall with a broadly pyramidal crown that becomes domelike with age. The grayish-brown bark of young trees has prominent resin blisters. It becomes hard, vertically furrowed, reddish-brown, and moderately thick with age. The blunt-tipped needles, 2-5 cm (1-2 in) long, are grooved, dark and shiny yellowish-green above, and whitish below. They are arranged on opposite sides of branches in 2 rows creating flattened sprays. Male cones are small, yellow, and pendant while seed cones are erect, cylindrical, yellow-green, and up to 11 cm (4.5 in) long with scales broader than long.

Grand fir is confined to north-facing slopes and moist to wet sites primarily in the montane zones here at its eastern range limits. It is most abundant in n. ID and ranges from nw CA to s. B.C.

2. Abies lasiocarpa (Hook.) Nutt.

Subalpine Fir

Subalpine fir is a slender, spire-crowned tree up to 40 m (130 ft) tall on favorable sites. At timberline, as a component of krummholz (shrub-like growth form of tree species), it has a prostrate form (<1 m tall). The bark of young trees is smooth and gray with evident resin blisters. It becomes furrowed and reddish-scaly with age. Foliage is intensely dark green to bluish-green. Upper branches are short and stiff; the lower ones are drooping. Where snowpacks are deep and long-persisting, the lowest branches remain appressed to the ground where they may take root (layering) and develop a "skirt" of bushy, ascending to erect branches. Needles are blunt or notched, green on both sides with a conspicuous white stomatal stripe along the midvein, and ridged beneath. They are twisted toward the upper side of the twig, and leaf arrangement is decidedly whorled when viewed from the branch tip. Buds are rounded and orange-brown. Male and female cones are dark purple-blue; mature female cones are about 10 cm (4 in) long.

Subalpine fir is the common "fir" of high (subalpine) elevations and cool canyon bottoms. Its narrow spirelike crown minimizes snow damage and its plasticity of form and vegetative spreading ability allows it to survive at tree line (as krummholz forms). It is widespread in the high mountains of western North America.

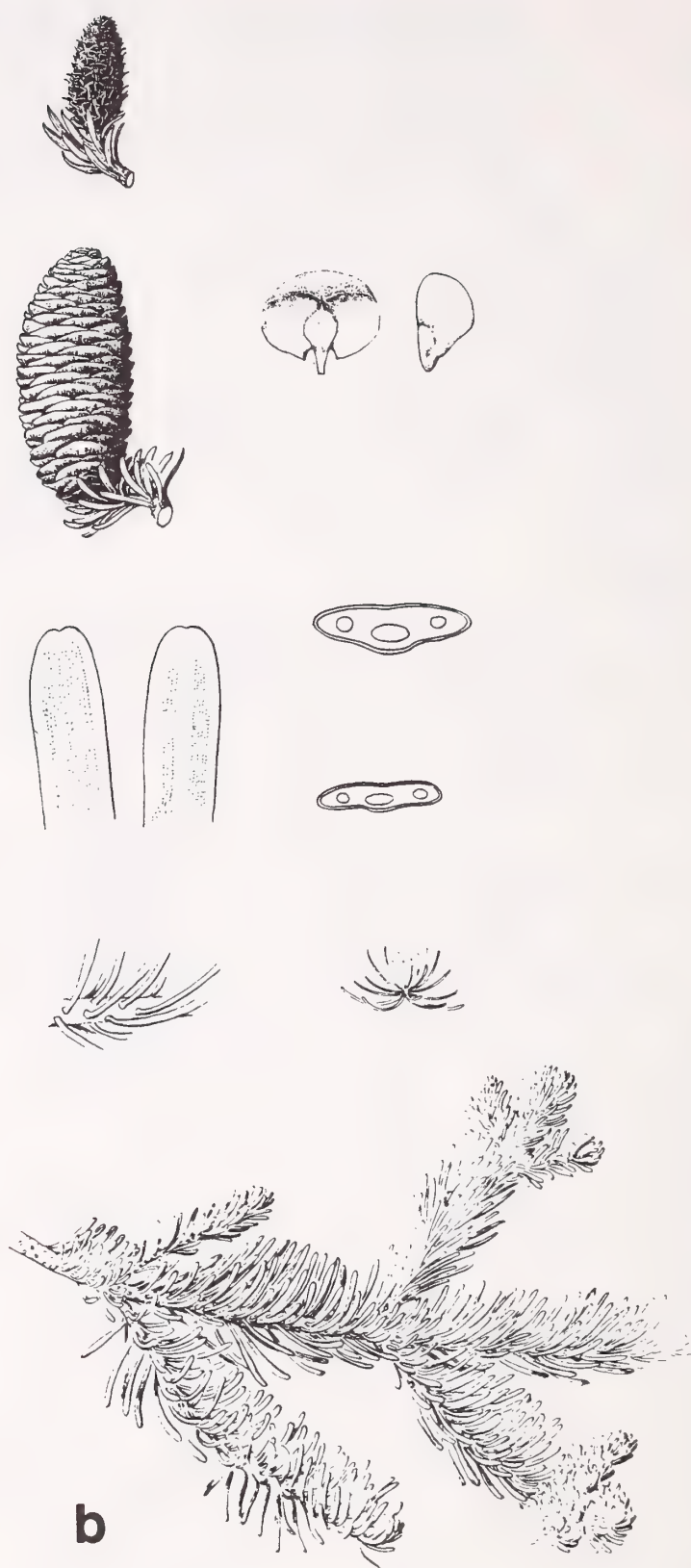
Larix Adans. Larch, Tamarack

Larches are tall trees with deciduous, bright and light green, needlelike leaves, lighter colored than other needle-leaved conifers. Leaves are conspicuously clustered on short spur shoots (woody knobs on the branches) or, arranged singly in spirals on new growth and on seedlings. In autumn, leaves turn bright yellow. Unisexual male and female cones appear on the short lateral spurs of the upper branches. Male cones are yellowish-green and short-lived. Seed cones develop from blood- or bright magenta-red immature structures in one season. They open and release winged seed in the fall but persist on the tree through winter.

3. Larix lyallii Parl.

Alpine Larch, Subalpine Larch, Lyall's Larch

Alpine larch is rarely more than 25 m (80 ft) tall with a trunk that tapers upward. Crowns are broad and irregular with drooping branches that turn up at the ends. New shoots are covered with wooly hairs, a



a. *Abies grandis* b. *A. lasiocarpa*

good identifying field character. The seed cones, 3-5 cm (1-2 in) long, have ragged, densely hairy scales, greatly exceeded by the dark purple long-tailed bract.

Alpine larch is a long-lived, sporadically distributed but locally abundant component of the upper subalpine and timberline zones. It often occurs on talus slopes. This is the only tree that frequently forms a "second" and final timberline above the krummholz (shrub-like forms) of whitebark pine or subalpine fir. In these sites it is dwarfed and gnarled but maintains its upright stature. Restricted to high mountain ranges of the inland Pacific Northwest.

4. Larix occidentalis Nutt.

Western Larch, Tamarack

Western larch is a tall tree, occasionally 50-60 m (165-195 ft) in our area, with a rather narrow crown, thick, deeply furrowed, reddish-brown bark and a long, clear trunk. The needles are yellowish-green, like those of alpine larch. Mature seed cones are up to 4 cm long with nearly orbicular scales.

This is a common tree, occurring in mixed stands in the northern part of our region, where it is characteristic of north-facing slopes and other moist sites at low to middle elevations. It is widespread in such habitats in the inland portion of the Pacific Northwest.

Picea A. Dietr. Spruce

5. Picea engelmannii Parry

Engelmann Spruce

Engelmann spruce is up to 60 m (195 ft) tall and evergreen, with a conical crown. At timberline it becomes dwarfed, gnarled, and shrublike. The lower branches droop to the ground on open-grown trees. Bark is composed of thin, small, shedding plates that range from brownish-red to purplish. Needles are deep bluish-green, firm, sharp-pointed, and four-sided. They are spirally arranged, curved toward the upper surface of the twig, and attached to a small (1 mm), peg-like base. Male and female cones are borne on the same tree. The male cones are small, yellow, and deciduous soon after shedding pollen. Female cones are pendant and 4-6 cm (2 in) long. They mature to light brown, and ripen and shed seed the first season.

This species is found in the montane and subalpine zones but is most abundant and competitive in sites with high soil moisture, such as riparian areas and seeps. It inhabits high mountains of the inland West from central B.C. to s. AZ.

Pinus L. Pine

Pines are evergreen trees with long, needlelike leaves growing in bundles (fascicles) of 2, 3, or 5. Male and female cones are borne on the same tree. Cones appear in late spring or early summer, the male cones as short, catkinlike bodies in clusters at the base of new growth. Female cones are borne singly, in clusters, or pairs on the current year's growth. They consist of many scales arranged about a central axis, and they mature the fall of the second year. Our pines are divided into the 2 or 3-needled ("hard") pines and the 5-needled ("soft") pines.

Group 1. Included here are "hard" pines with needles in clusters of 2-3. These pines often grow in extensive, pure and nearly uniform stands.

6. Pinus ponderosa Dougl.

Ponderosa Pine, Western Yellowpine, Bull Pine

Ponderosa pine is a large tree, to 55 m (180 ft), with a straight, slightly tapering trunk that, at maturity, is clear of lower branches. The crown is conical and composed of stout branches. The strength of the deep taproot renders the tree resistant to high winds. Bark of vigorously growing trees is brownish-black, while that of mature trees is thick, orange-brown, and deeply furrowed in long plates. Needles up to 20 cm (8 in) long occur in clusters of 3. Male cones are yellowish and soon deciduous. Female cones are brown-tan, broadly ovate, up to 14 cm (6 in) long, and bear a stout recurved prickle at the thickened scale tip.

Pure, open stands of this species represent lower timberline conditions in our valleys. Ponderosa pine is an important early successional species in lower montane forests and ascends south-facing slopes as high as 1900 m (6,200 ft). It is long-lived and very resistant to surface fires. Our variety is ponderosa. Distributed from s. B.C., south to Baja Cal. Var. scopulorum occurs east of the Continental Divide and in the sw. U.S.

7. Pinus contorta Dougl.

Lodgepole Pine

In our area, this species has a straight, slender, slightly tapered trunk clear of lower branches when grown in dense stands. Tree height only infrequently exceeds 35 m (115 ft), and the crown is short, narrow and round-topped. Bark is thin and orange-brown to dark grey and scales off in small flakes. Needles are slightly twisted, firm, yellowish-green and 3-5 cm long; they are arranged in bundles of 2. When immature, cones of both sexes are reddish-orange. Mature seed cones are tan-brown, egg-shaped, up to 5 cm long, borne in clusters, and have scales thickened at their distal end into a curved prickle.



JRJ

a. *Larix lyallii* b. *L. occidentalis* c. *Picea engelmannii*

This species typically forms dense, even-aged, pure stands as a result of past fires. It is broadly distributed through most of the forested elevations. Our variety, latifolia Engelm., is abundant in the Inland West from Yuk. to s. CO.

A variable proportion of the cones remain on the tree unopened (with viable seed) for many years. Crown fires cause these serotinous cones to open and shed seed, thus re-establishing the population.

Group II. Included here are the 5-needled "soft" pines.

8. Pinus albicaulis Engelm.

Whitebark Pine

Whitebark pine is a small to medium-sized tree, seldom more than 30 m (100 ft) tall. Under the most severe timberline conditions gnarled, spreading tree, or low shrub (*krummholz*) forms predominate. It has a short, much tapered, and frequently multiple-stemmed trunk and an open, irregular crown of wide-spreading branches. On young trees the bark is thin, light gray, and smooth. Bark on older trunks is fissured into narrow light brownish-gray scales and is generally similar to that of lodgepole pine. Rigid, slightly curved needles, 4-7 cm (2-3 in) long, are clustered in 5's. Young male and female cones are small, bright red, catkinlike bodies. Mature seed cones are dark purple-brown, egg-shaped, and 5-8 cm long. They ripen on the tree by late August or September of the second year. Most are harvested by red squirrels or Clark's Nutcrackers. The few cones left on the tree through winter remain essentially closed. Seeds are large, nut-like and wingless. These characters have apparently coevolved with animal foraging behavior.

This is the characteristic tree of exposed ridges, south- and west-facing slopes at the highest elevations, where it dominates at treeline. It is the hardiest tree of cold, dry sites in the high mountains of the inland West from s. Can. to CA and nw. WY.

Cone production is highly variable by year; the vast majority are harvested in our area by Clark's nutcrackers and red squirrels. On exposed slopes the nutcrackers cache a variable number of seeds (usually 1-5) just below the soil surface. Many of these caches result in extensive germination of whitebark pine (multiple-stemmed if several seeds survive) at considerable distances from the parent tree. This species is susceptible to both white pine blister rust (Cronartium ribicola) and bark beetle (Dendroctonus ponderosae); these pathogens are responsible for mass mortality in some stands.

9. Pinus monticola Dougl.

Western White Pine

In our area, western white pine is an uncommon, medium-sized forest tree, seldom exceeding 30 m (100 ft). In closed stands it has a long, branch-free, slender trunk and a narrow, conical, crown with drooping branches. Bark of young trees is silvery-gray and smooth; on old trees, bark is cinnamon-brown and broken into small, thick plates in a checkered pattern. Needles in clusters of 5 are bluish-green, 5-10 cm (2-4 in) long, and lax (soft to the touch). Male flowers are yellow, while the female ones are pale purple and arranged at the ends of upper branches. Slender, perceptibly curved seed cones, 12-38 cm (5-15 in) long, are erect and green at first, but they mature to light brown and become pendulous on curved stalks. Seeds have large wings and are released in early fall, soon followed by cone abscission.

Widely scattered individual trees can be found growing in some of the cool mountain canyons in the northern and western parts of our area (e.g. Bass Creek, near the abandoned dam pond). Many of these trees are infected by the introduced white pine blister rust which causes extensive damage to the upper crown (noted as pitchy wounds) and eventually death. This species becomes a major forest component to the northwest in the more humid montane forests of n. ID and from s. B.C. south to CA and extreme w. NV.

Pseudotsuga Carr. Douglas-Fir

10. Pseudotsuga menziesii (Mirbel) Franco

Douglas-fir

Douglas-fir is an evergreen tree, up to 45 m (150 ft) tall, with crowns that are at first pyramidal but become round- or flat-topped with age. The bark of juvenile stems is thin, smooth, and grayish tan-brown with fewer and smaller resin blisters than those of subalpine fir. Mature trees have thick, corky, and deeply furrowed bark without resin blisters. Bark, when broken or sliced, has alternating light brown and dark brown bands. The apical buds are shiny, reddish-brown, and sharp-pointed. Needles are flattened in cross-section with 2 whitish longitudinal bands below. Immature, male, catkinlike cones are bright red, and female ones are green with a reddish tinge. Mature seed cones are egg-shaped, drooping, brown, and 4-7 cm long, with thin scales that are much shorter than the conspicuously protruding 3-forked bracts.

This is the most abundant tree in w. MT, although it does not ascend to upper tree line nor is it found in poorly drained sites. Our variety is glauca (Beissn.) Franco; it is common throughout much of interior western North America from central B.C. to n. Mex.

Tsuga Carr. Hemlock

11. Tsuga mertensiana (Bong.) Carr.

Mountain Hemlock

In our area mountain hemlock is up to 30 m (100 ft) tall with luxuriant foliage and a gracefully drooping leader. The crown is narrowly pyramidal when young, becoming irregular with age. Needles are nearly circular in cross section, round-tipped, and 12-20 mm long. They radiate from all sides of densely



a. *Pinus ponderosa* b. *P. contorta* c. *P. albicaulis*

foliated branchlets. Bark is dark reddish-brown with narrow ridges, becoming heavily furrowed on old trees. Immature male flowers are purple, while female ones are green to purple. Both sexes are often borne on the same branch. The seed cone is cylindrical, light to mid-brown, 3-6 cm long, and drooping. It opens and releases the wide-winged seeds in September or October and then abscises.

Single trees are known in the vicinity of Lolo Peak and they become more common westward atop high ridges in the Lolo Pass area. A small isolated grove is also found on Point Six in the Rattlesnake Mountains north of Missoula. This species becomes abundant in the subalpine zone north of Lolo Pass in nw. MT and n. ID. This tree is primarily associated with humid coastal mountains (subalpine zone) from s. AK to n. CA.

TAXACEAE YEW FAMILY

Taxus L. YewTaxus brevifolia Nutt.

Pacific Yew

Pacific yew is an evergreen shrub with spreading branches and drooping twigs. The very thin bark is comprised of outer purplish scales covering the newly formed reddish to red-purple inner bark. The flat, glossy dark green (above) and yellowish-green (below) needles have sharp-tips, slender petioles, and a prominent midrib. Though needles are spirally arranged they are twisted so as to form flat sprays. Male and female cones are borne on separate plants. Male cones are round and consist of a tight bundle of stamens subtended by roundish bracts. Female cones are borne on branchlet undersides. The seeds when ripe are surrounded by a fleshy red, berrylike aril.

In our region yew occurs mainly in moist habitats along major canyon bottoms, at elevations up to 1800 m (6,000 ft). This is a Pacific Coast species, and our area forms the eastern limits of its distribution. Further west, in the mountains of north-central ID, it is locally abundant, growing as a small tree in the forest understory.

Foliage is said to be extremely poisonous to cattle and horses. Though not touched by deer, it is heavily browsed in winter by moose. Berries, poisonous to humans, are eaten by thrushes, solitaires and waxwings.

DIVISION ANTHOPHYTA

FLOWERING PLANTS

CLASS MAGNOLIOPSIDA

"DICOTS"

ACERACEAE Maple Family

Acer L. Maple

Maples are tall, deciduous shrubs or trees with male and female flowers on the same or separate plants. Flowers are arranged in racemes, corymbs or umbels. Flowers are regular (radially symmetrical) and unisexual, with 5 sepals, separate or united, and 5 separate petals (or none). The distinctive fruits (samaras), that become windborne "helicopters" when dispersed, consist of 2, large winged achenes united at the base.

- | | | |
|----|---|---------------------------|
| 1. | Leaves compound with 3-5 leaflets, terminal leaflet stalked..... | (2) <u>A. negundo</u> |
| 1. | Leaves simple..... | 2 |
| 2. | Leaf sinuses terminating in a an acute angle; the margins doubly dentate or serrate.... | (1) <u>A. glabrum</u> |
| 2. | Leaf sinuses rounded and broad; the margins coarsely toothed or lobed..... | (3) <u>A. platanoides</u> |

1. Acer glabrum Torr.

Rocky Mountain Maple

Rocky mountain maple is a frequently multiple-stemmed and rapidly growing tall shrub or small tree, to 10 m (35 ft) tall. The twigs are bright purplish-red and the older bark is gray. The simple, sharply and doubly-serrate, opposite, and palmately divided leaves have 3-5 lobes. Its leaves are smaller than those of other maples of this area and their fall coloration runs to pale yellows and browns. Male and female flowers are borne on the same or separate plants. Flowers are borne in leaf axils in a loose, flat-topped cluster. They bloom at nearly the same time that leaves are unfurled.

This shrub is common on open to closed montane forests and as a component of riparian stringers. AK and s. Alta., south to CA, NM, and NE.



a. *Pinus monticola* b. *Pseudotsuga menziesii* c. *Tsuga mertensiana* d. *Taxus brevifolia*

This, our only native species of maple, is a valuable browse plant for elk and moose. Seeds are eaten by grosbeak and several small mammal species.

2. Acer negundo L.

Boxelder, Manitoba Maple

Boxelder has a coarse branching habit, gray trunk bark, and green twigs. Trees escaped from cultivation may be as tall as 12 m (40 ft) but cultivated trees can be much larger. The leaves are pinnately divided into mostly 3- to 5-lobed, coarsely serrate and ovate to lance-shaped leaflets. Unisexual, apetalous flowers arranged in dense, drooping clusters appear before the leaves. The winged fruits fall in the winter or spring.

Boxelder was once a popular planting in our area; it is a widespread native east of the Continental Divide. There are several escaped populations in the lower reaches of creeks of the Bitterroot Valley (as along MacClain Creek sw. of Lolo).

3. Acer platanoides L.

Norway Maple

Norway maple is a large, popular shade tree of our towns. It grows up to 25 m (80 ft) tall in our area. Many thousands of seedlings appear every spring and thrive with irrigation. Specimens have established in Greenough Park with no artificial irrigation. Given the considerable understory shade tolerance of this species, these trees may succeed to dominate the climax community. (Not illustrated).

AMARANTHACEAE Amaranth Family

Amaranthus L. Pigweed, Amaranth

Pigweeds are annual herbs with erect to prostrate stems. The leaves are entire or nearly so, petiolate, alternate or opposite, and rough to the touch. Male and female flowers are borne on the same or separate plants. The inconspicuous apetalous flowers are sessile on terminal or axillary branches, in dense racemes, or in small clusters in the leaf axils. The inflorescences are subtended by one or more straw-colored or greenish, persistent, membranous, and strong-smelling bracts. The 2-5 sepals of the calyx are separate.

All our members of this genus are ubiquitous weeds native to North America. Their pattern of distribution and population sizes are determined by human activities. They occur exclusively on various kinds of disturbed soils and are among our "rough-to-the-touch" weeds.

- | | | |
|----|--|----------------------------|
| 1. | Flowers in small clusters in the leaf axis; leaf blades only rarely over 3 cm long..... | 2 |
| 1. | Flowers both axillary and terminal clusters; leaf blades longer than 3 cm..... | 5 |
| 2. | Sepals 3; seeds 0.6-1 mm long..... | 3 |
| 2. | Sepals 4 or 5; seeds 1.2-2 mm long..... | (6) <u>A. graecizans</u> |
| 3. | Plants prostrate; sepals of pistillate flowers very unequal..... | (7) <u>A. californicus</u> |
| 3. | Plants mostly erect; sepals equal or nearly so..... | (1) <u>A. albus</u> |
| 4. | Plants dioecious; bracts of inflorescence mostly ovate and <3 mm long..... | (5) <u>A. arenicola</u> |
| 4. | Plants monoecious (staminate flowers often few); inflorescence bracts >4 mm and narrowly lanceolate..... | 5 |
| 5. | Stamens usually 3; sepals of pistillate flowers gradually tapered to spiny tip..... | (3) <u>A. powellii</u> |
| 5. | Stamens 5; sepals of pistillate flowers rounded or truncate below the spine-tipped apex..... | 6 |
| 6. | Pistillate sepals 1.5-2 mm long; terminal spike slender and cylindrical..... | (4) <u>A. hybridus</u> |
| 6. | Pistillate sepals 2.5-4 mm long; terminal spike robust and thickened near base..... | (2) <u>A. retroflexus</u> |

Group I. Assemblage comprising erect or nearly erect forbs.

1. Amaranthus albus L.

White Pigweed, Tumbleweed

White pigweed is an annual to 60 cm (24 in) tall. It has a spreading, branched habit, with the lowest branches decumbent and ascending and then curving inward to give plants a rounded outline. The 4 cm long, thick margined and white-veined leaf blades are elliptic, to ovate or inversely egg-shaped in outline. Flowers are borne in small clusters between leaves and stem. Male and female flowers are borne on the same plant. In both sexes, the sharp-tipped, oblong-lanceolate bracts are at least twice as long as the narrow, scalelike sepals.

This is a very common weed of cultivated and waste land. B.C. south to Mex. and east to most of s. Can. and U.S.

AMARANTHACEAE

2. Amaranthus retroflexus L.

Redroot Amaranth

Redroot amaranth is a much branched, evidently hairy, annual with a main stem up to 1.5 m (60 in) tall. The largest of the numerous leaves are 10 cm (4 in) long with diamond-shaped to broadly lance-shaped blades that narrow abruptly toward the petiole of roughly the same length. Blades are usually prominently white-veined below. Male and female flowers are borne on separate plants. Green to purple tinged flowers are borne sessile on simple or compound terminal or axillary stalks. The 4-5 sepals of female flowers are spoon-shaped to lance-shaped, rounded or slightly notched at the tip, and with or without a protruding midnerve.

This appears to be the most common Amaranthus species around Missoula. From Can. south to the tropics.

3. Amaranthus powellii Wats.

Powell's Amaranth

Stems of Powell's amaranth, an erect annual, are reddish, striate, glabrous to slightly hairy, simple to branched and sometimes over 1 m (40 in) tall. The numerous glabrous leaves have lance- to diamond-shaped blades up to 10 cm (4 in) long, that are narrowed abruptly to petioles of about the same length. Male and female flowers are borne on the same plant. Flowers lacking pedicels are arranged in prominent clusters, often more than 15 cm (6 in) long. Linear to lance-shaped, sharply pointed, bracts, 2-5 mm long, subtend 4-5 sepals.

This species is one of our more uncommon amaranths. From Can. south to Mex. and South America; Eurasia.

4. Amaranthus hybridus L.

Prince's Feather

The erect to ascending stems of this annual are mostly branched, glabrous to pubescent, and approaching 1.5 m (60 in) tall. Leaf blades are diamond-shaped to lance-shaped with rounded or rapidly tapering tips and wedge-shaped or rounded bases. Petioles are as long as the blades. Male and female flowers occur on the same or separate plants. Flowers are borne sessile in axillary or terminal compound inflorescences. The lance-shaped and spine-tipped bracts are about twice as long as the sepals, which are no longer than the ovary.

Barely extending into our area from the east and south, this is our most uncommon pigweed. Great Plains Region; introduced into much of the rest of the U.S.

The short sepals of A. hybridus help distinguish it from A. retroflexus, with which it has many features in common. (Not illustrated).

5. Amaranthus arenicola Johnson

Sand Pigweed

The stem of sand pigweed is slender, erect and not much branched. Leaf blades are ovate-lanceolate or roughly diamond-shaped to ovate and blunt-tipped with slender petioles that are shorter than the blade. Flowers are densely packed in axillary and terminal, slender compound spikes (flowers all sessile). The terminal spike is prominently the largest.

This species has been collected near the old railroad station in Missoula. Great Plains region; introduced into much of the w. U.S.

Sand pigweed is easily recognized; it is much more slender and erect growing than the common species. (Not illustrated).

Group II. Plants growing prostrate or nearly prostrate are included here.

6. Amaranthus graecizans L.

Prostrate Pigweed

[A. blitoides Wats.]

The pale green to reddish stems of this annual, prostrate pigweed, are branched from the base, to 60 cm (24 in) long, and glabrous to pubescent. The crown may be as much as 1 m (40 in) in diameter. The leaf blades, 1-3 cm long, have stiff, thickened margins and are spoon-shaped to egg-shaped with wedge-shaped bases and tips that are rounded with a small, sharp point at the apex. Male and female flowers are borne on the same plant. Flowers are arranged in dense, small, axillary clusters. Bract length equals, or slightly exceeds, that of the 3 translucent sepals.

This is a very common weed in our area, often seen along sidewalks. In other areas it occurs on arid sites, such as sagebrush grasslands. From e. WA east to the ND, KS, and TX as a native and an introduced weed elsewhere in U.S.

7. Amaranthus californicus (Moq.) Wats.

California Amaranth

The spreading, prostrate stems of California amaranth form mats up to 60 cm (24 in) broad. The herbage is green to reddish-purple and glabrous to hairy. The egg-shaped to lance-shaped leaf blades, 5-30 mm long, have a short, sharp apex and are abruptly narrowed to a slender petiole. Both the thickened, irregularly curled to slightly wavy leaf margins and nerves on the underside are whitish. The narrowly lance-shaped and sharp-pointed bracts subtend and are slightly longer than the 3 sepals.

This species is associated with vernal pools and moist, somewhat alkaline flats or shore lines. From e. WA east to Alta., MT, and NV and south to CA.

With cursory examination A. californicus is hardly distinguishable from A. graecizans.

ANACARDIACEAE Sumac Family

Rhus L. Sumac, Poison Ivy

This genus includes deciduous native shrubs and subshrubs. Leaves are alternate and pinnately or palmately compound. Flowers are unisexual or bisexual; if unisexual, males and females are on separate plants. Flowers are inconspicuous, small, yellowish or greenish, and borne in terminal or axillary inflorescences. The calyx is 5-lobed and there are 5 petals. The fruit is a berry-like drupe.

1. Fruit not red and nearly or completely glabrous; leaflets 3.....(2) R. radicans
1. Fruit profusely red-hairy; leaflets 7-29.....(1) R. glabra

1. Rhus glabra L.

Smooth Sumac

Smooth sumac is a smooth-barked, deciduous shrub that spreads by long, shallow roots and tends to form extensive thickets. In the wild it is not more than 2 m (6 ft) tall. The large leaves are pinnately compound with 7-29 leaflets, 5-12 cm (2-5 in) long. The small, yellowish flowers and the flattened berries, densely set with reddish hair, are borne in compound panicles.

Where once locally common, such as on the lower slopes of Mount Jumbo and Mount Sentinel, it is disappearing. From s. B.C. south on the e. side of the Cascade Mountains through OR, NV, and Mex., east to NH and GA.

Fall leaf colors are the brightest and deepest reds of all our native shrubs. Grosbeaks and other finches feed on the berries, mainly in late winter. Sumac does not grow beneath the canopy or near the roots of other tree species.

2. Rhus radicans L.

Poison Ivy

[Toxicodendron rydbergii (Small) Greene]

This is an erect or trailing shrub, spreading from a creeping rootstock and forming open colonies. In our area, poison ivy is seldom more than 150 cm (60 in) tall. The shiny, deep green leaves are divided into 3 egg-shaped leaflets, 10 cm (4 in) long. They are rounded at the base and each has a distinctive midvein that runs into the pointed tip. The leaflets are lax; their drooping habit is not assumed by any other of our plants. The small greenish-white flowers and the smooth, white, fleshy, and one-seeded fruits (drupes) are borne in congested axillary inflorescences.

Poison ivy occurs more frequently on the outskirts of our settlements (lower slopes of Mount Jumbo and Sentinel, Rattlesnake Valley north of Missoula, and abandoned homesteads throughout the valleys) than in the wilds. This distribution might be due to greater humus accumulation caused by man and/or animals and also by concentrated bird activity near settlements in winter. From e. WA and OR east to Atlantic Coast and south to Mex.

The drupes are relished by robins, cedar waxwings, flickers, downy woodpeckers and other birds. The oil secreted by leaves and stems is toxic to many people; some are stricken with violent skin reactions. The few people immune to the toxin should beware of transferring the toxins to sensitive people through touch.

APOCYNACEAE Dogbane Family

Dogbane Family consists of rhizomatous, perennial herbs. They have a milky juice, opposite, entire leaves, and an open, umbrellalike inflorescence of small flowers with tubular or bell-shaped corollas.

Apocynum L. Dogbane

1. Flowers less than 5 mm long; corolla greenish-white to white and usually less than twice as long as the calyx; corolla lobes erect; leaves not drooping.....2
1. Flowers more than 5 mm long; corolla pink, and usually more than twice as long as calyx; corolla lobes spreading or reflexed; most leaves drooping.....3
2. Seed pods usually more than 12 cm long; leaves of main stem petioled and often not heart-shaped at the base.....(3) A. cannabinum
2. Seed pods less than 12 cm long; lower leaves of main stem usually sessile or subsessile and with heart-shaped bases.....(4) A. sibiricum



a. *Acer glabrum* b. *A. negundo* c. *Amaranthus albus* d. *A. retroflexus* e. *A. powellii*
 f. *Amaranthus graecizans* g. *A. californicus*

3. Calyx with narrowly lanceolate lobes usually more than 1/2 as long as the corolla; leaves mostly ascending.....(2) A. medium
3. Calyx with lanceolate to ovate or deltoid lobes usually less than 1/2 as long as the corolla; leaves mostly drooping or spreading.....(1) A. androsaemifolium

Group I. Included here are species with drooping or spreading leaves and flowers that are pinkish or have pink veins.

1. Apocynum androsaemifolium L.

Creeping Dogbane

These are perennials with erect, branched, single stems, 20-50 cm (8-20 in) tall. The opposite leaves, up to 6 cm (2 in) long, are drooping and petiolate to nearly sessile. Flowers have a cylindrical, pinkish corolla with nearly erect lobes. The seed pods (follicles), 5-14 cm (2-5 in) long, are held erect.

Common in the wooded or dry, open areas in the foothills of the Bitterroot Mountains. Our variety is pumilum Gray which has upright follicles and corolla lobes. Distributed throughout s. Can. and U.S.

On dry slopes its leaves turn a soft yellow before those of associated species.

2. Apocynum medium Greene

Western Dogbane

Similar to A. androsaemifolium, but it is taller, to 1 m (40 in), with spreading (not drooping) leaves, and a bell-shaped corolla that has spreading lobes. The seed pods are pendulous.

Western dogbane is locally common on moist soil, often on or near the banks of the Clark Fork and Bitterroot rivers. It is often associated with Populus spp., Solidago occidentalis, and Arnica chamissonis. From valleys of western U.S. to the Atlantic Coast. (Not illustrated).

Group II. Included here are plants with erect or ascending leaves, lateral branches that surpass the terminal inflorescence, and a white or greenish corolla.

3. Apocynum cannabinum L.

Common Dogbane

Plants are erect, glabrous, freely branched, and 30-100 cm (12-40 in) tall. The spreading to obliquely erect and yellowish-green leaves are short petiolate, to 10 cm (4 in) long, and egg-shaped to lance-shaped. Both the base and tips are rounded or acute, and the apex has a toothlike tip. Seed pods are 12-18 cm (5-7 in) long and sickle-shaped.

This species is locally common along our rivers below high water marks, on islands, and low banks. It is often in half shade beneath cottonwood and willow canopies. Distributed throughout U.S. and Can.

4. Apocynum sibiricum Jacq.

Siberian Dogbane

Very similar to A. cannabinum, but differing by having sessile or subsessile, heart-shaped and clasping leaf bases (at least the lower leaves) and seedpods that are 4-11 cm (1-4 in) long and nearly straight.

Collected on a northern exposure of Waterworks Hill on gravelly, vernal moist and disturbed site. Much of U.S. and Can.

ARALIACEAE Ginseng Family

Aralia L. Aralia

Aralia nudicaulis L.

Wild Sarsaparilla

Wild sarsaparilla is a perennial forb with widely branching rhizomes from which arise short woody rootcrowns that barely reach the soil surface. Solitary leaves, up to 50 cm (20 in) tall, are twice divided, first into 3's and then into 3-5 elliptic, toothed leaflets, 5-12 cm long. The scaly flowering stem is much shorter than the leaves. The inflorescence consists of 3-7, slender-stalked, nearly spherical inflorescences bearing numerous yellow-green 5-merous flowers. Fruits are 6-8 mm long, purplish-black, berrylike drupes.

In northwestern Montana and northern Idaho, this species is indicative of relatively warm, moist woods usually confined to valley and lower montane zones. It often occurs on just the first bench or terrace above a stream. In our area it has been recorded only from the southwest section. From e. B.C. and e. WA, east through north-central states to the Atlantic Coast and south to CO.



a. *Rhus radicans* b. *R. glabra* c. *Apocynum androsaemifolium* d. *A. cannabinum* e. *A. sibiricum*
 f. *Aralia nudicaulis*

ARISTOLOCHIACEAE Birthwort Family

Asarum L. Wild GingerAsarum caudatum Lindl.

Wild Ginger

A perennial forb, wild ginger is capable of forming large mats from extensive, trailing, and aromatic rootstocks. The paired, persistent (not evergreen in our area), entire, kidney-shaped to heart-shaped leaves are deep green above and lighter below with the odor of ginger when crushed. The petioles may be up to 20 cm (8 in) long. Perfect flowers, that lack a corolla but have a brownish-purple, flared, 3-lobed calyx tube, are borne singly in the leaf axils. Fruits are dry, leathery capsules.

This shade-tolerant species is found in the western portion of our area. It is indicative of moist forest environments of the montane zone (occasionally to the lower subalpine zone). A population from Upper Miller Creek in the northern Sapphire Mountains is an eastern outlier of the species. From B.C. south to Santa Cruz Mountains, CA and east to n. ID and nw. MT.

ASCLEPIADACEAE Milkweed Family

Asclepias L. MilkweedAsclepias speciosa Torr.

Showy Milkweed

Showy milkweed is a stout, fleshy, woolly-haired, milky-juiced perennial, growing to 120 cm (48 in) tall. The unbranched stems rise from thick, widespread rhizomes. The opposite, entire, and short-petiolate leaves are lance-shaped, 10-20 cm (4-8 in) long, and prominently transverse-veined. Flowers with 5 rose-purple and sharply reflexed petals are arranged in umbrella-shaped inflorescences.

Occurs infrequently in the Bitterroot Valley, mostly in roadside drainage ditches. East side of Cascades from B.C. south to non-mountainous portion of CA, east to the central states.

BALSAMINACEAE Touch-Me-Not Family

Impatiens L. Touch-me-not, Jewelweed

This genus contains succulent annual herbs with thickened nodes and watery juice. The simple, alternate leaves have petioles and thin elliptic to lance-shaped and toothed blades. Flowers are mostly bisexual, axillary, and not radially symmetrical. Contrary to first appearances, there are 8 perianth parts: 1 sepal is saccate and spurred (hollow, tubular extension of floral organ), and the other 2 are greatly reduced. The 4-5 petals are united into 2 lateral, deeply lobed pairs. The seed capsule is 5-celled, podlike and when touched, bursts to eject the ripe seeds.

1. Sepal bases are pouched-out with a tubular spur.....(1) I. aurella
1. Sepal bases are saccate but lacking spur.....(2) I. ecalcarata

Impatiens aurella Rydb.

Orange Touch-Me-Not

Plants are succulent, freely branched annuals growing to 60 cm (24 in) tall. The alternate leaves, 3-12 cm (1-5 in) long, have elliptic to egg-shaped blades with coarsely toothed and spine-tipped margins. The yellow to orange flowers lack spots but have a small recurved spur.

Known from several colonies along an irrigation ditch in Grass Valley, west of Missoula. Plants are exposed, at least temporarily, to standing water. This species is usually reported to occur in moist forests. AK south to OR and east to ID and MT.

Impatiens ecalcarata Blank.

Spurless jewelweed

This annual species is much like I. aurella but taller, to 1 m (40 in). It is more branched, and the flowers are not spurred. The paired flowers are pale yellow to orange and 1-2 cm long.

Occurs scattered in the Bitterroot River Valley between Missoula and Darby. It is always found on wet sites in the shade of alder, dogwood, and willows. B.C. to OR, east to MT.

BERBERIDACEAE Barberry Family

Berberis L. Barberry, Oregon Grape

This genus includes shrubs with yellow or yellowish-green inner bark and often yellow wood and roots. Leaves are alternate, simple or compound, deciduous or evergreen, and often set with small spines. The small, yellow, perfect and fragrant flowers are composed of floral elements in 5 whorls of 3. They are arranged in pendulous or erect clusters. Fruits are succulent, purplish-black or red berries.

BETULACEAE

1. Leaves pinnately divided (compound); stem not spiny.....(1) B. repens
1. Leaves simple; stems spiny.....(2) B. vulgaris

1. Berberis repens Lindl.

Oregon Grape

[Mahonia repens (Lindl.) G. Don]

Oregon grape is a low-growing evergreen shrub, up to 30 cm (1 ft) tall, originating from creeping and sparsely branched rootstocks. Glossy (upper surface only) or dull leaves are pinnately divided into 3-7 sessile, egg-shaped, and spine-toothed leaflets. Stalked, yellow flowers are clustered in terminal, erect narrow inflorescences. Fruits are dark purplish-blue, glaucous, juicy, and acidic berries.

This dwarf shrub is extremely common and widespread in our area, mostly in dry to moist open forests of the foothills and montane zone. From e. WA east to Alta. and south to TX, NM, NV, and ne. CA.

Some of the foliage assumes a dull purplish or red color in winter. The berry is suitable for preserves.

2. Berberis vulgaris L.

Common Barberry

Common barberry is an introduced deciduous shrub, to 1.8 m (70 in) tall. Rootstocks produce many erect, sparsely branched stems with outward-curving tops. Simple, petiolate, lance-shaped to egg-shaped, and sharply toothed leaves turn reddish-orange in the fall. Flowers are borne in pendulous, elongated clusters (racemes). Berries are bright scarlet-red and acidic. They remain on the shrub throughout winter.

Though introduced for horticultural purposes, this shrub is now known as an alternate host for blackstem rust of wheat. For this reason it may be eradicated by now. Birds feed on the berries in spring. (Not illustrated).

BETULACEAE Birch Family

The birch family includes trees and shrubs with branches that grow from the upper axillary buds. The deciduous, petioled, simple and alternately arranged leaves have toothed margins and are pinnately veined (on either side of midvein the secondary veins run parallel and obliquely to the leaf margin). The unisexual minute flowers are densely crowded into catkins (aments) that shed and receive pollen before the leaves expand. Male and female flowers are born on the same plant. The male catkins are pendent while the female catkins are erect or pendulous, globose or ovoid and conelike. Fruits are small, one-seeded, and winged nutlets.

1. Clustered catkins composed in part of hardened, woody bracts to produce a cone-like structure that persists after ripened nutlets are shed; twigs without blister-like eruptions of the bark; buds mostly stalked.....Alnus
1. Bracts of catkins not woody and deciduous with the mature nutlets; blisterlike eruptions generally lacking; buds not stalked.....Betula

Alnus Hill Alder

Alders are small trees or shrubs with smooth, reddish or gray-brown bark. Their leaves are egg-shaped and serrate or dentate. The long and pendulous male catkins are grouped near the branch ends and drop after shedding pollen. The short, persistent, conelike, stalked female catkins are erect, borne near the base of the males. Fruits are flattened achenes with lateral wings or just a membranous border.

1. Catkins (inflorescences) appear on previous years growth before leaves unfurl; female catkins, ("cones"), borne on peduncles much shorter than length of body.....(1) A. incana
1. Catkins and leaves appearing simultaneously on twigs of current season; female catkins with peduncles longer than body of catkin.....(2) A. sinuata

Alnus incana (L.) Moench

Thin-leaved Alder, Gray Alder

From a single rootcrown, thinleaf alder produces a clump of gray-barked stems up to 10 m (40 ft) tall. When freshly cut the pith and cambium turn a rust color. The winter buds are stalked, bright red, and have a rounded apex. The alternate, doubly-toothed leaves are 3-7 cm (1-3 in) long, dull green on both sides, and not sticky. Catkins appear on growth of the previous season before the leaves unfurl in early spring. Fruits are wingless nutlets.

Our plants are var. occidentalis (Dippel) Hitchc. Thinleaf alder is associated with riparian and wetland sites of the valleys and lower montane zones. It does not occur in the subalpine zone. In the floodplains and foothills, it grows mostly as single shrubby clumps or small tree groves; near streams it often forms more continuous stands.

Alnus sinuata (Regel) Rydb.

Sitka Alder, Mountain Alder

[A. viridis (Vill.) Lam. & DC.]

Sitka alder grows as a multiple-stemmed bush with upward-curving stems 2-4 m (6-12 ft) tall. The bark is smooth and reddish-brown, aging to a gray-green with prominent lenticels (breathing pores). The leaf buds are sessile, dark purple, and pointed at the apex. The shiny leaves develop simultaneously with the catkins. Nutlets have a winged margin.

In the Bitterroot Mountains Sitka alder is common at 1200-2100 m (4,000-7,000 ft) associated with water courses or subsurface moisture. It may also establish prolifically on scarified clearcuts, road cuts, and even compacted logging roads. In this mountain range, alders are very common relative to willows.

Betula L. Birch

Birches are deciduous trees or shrubs, often with multiple stems from the same root. Some have bark that peels naturally in thin layers. Branchlets are often set with resinous, aromatic, wartlike glands and winter buds have several scales. Leaves are alternate, simple, petiolate, and sharply toothed. Catkins with unisexual flowers expand in early spring. Male and female flowers are borne on the same plant. Cylindrical, elongated, and pendulous male catkins are borne in clusters of 2 or more, while cylindrical to cone-shaped female catkins are borne singly and erect. The small, dry, 1-seeded fruits have winglike margins.

1. Plants mostly shrubs in habit or trees without white bark.....2
1. Plants trees with white, peeling bark (copper-colored when young).....3
2. Leaves mostly 1-2 cm long with rounded teeth and oval to obovate in outline; wings much narrower than nutlet; bogs and riparian habitat in mountains.....(1) B. glandulosa
2. Leaves mostly longer than 2 cm with various shapes (mostly subcordate to ovate) and pointed teeth; wings as wide as or wider than nutlet.....(2) B. occidentalis
3. Leaves with wedge-shaped bases and long tapering tips.....(4) B. alba
3. Leaves narrowly ovate to rotund, some with cordate bases; tips short- acuminate.....(3) B. papyrifera

1. Betula glandulosa Michx.

Bog Birch, Swamp Birch

Bog birch is a low and spreading to erect shrub, mostly less than 2 m (6 ft) tall in our area. Young branches are densely set with minute hairs and wartlike, resinous glands. Thick, somewhat leathery leaves have blades 15-25 mm long, with a rounded tip, tapering base, and bluntly toothed margins.

Though it occurs in the Bitterroot, Sapphire, and Rattlesnake Mountains, bog birch is relatively uncommon

in our area and does not occur at elevations greater than about 2200 m (7,200 ft). Characteristic environments include mires, wet meadows, swamps, and areas receiving late snowmelt waters. From AK south to Sierran CA and scattered occurrences in western U.S. to ne. U.S. and Greenl.

2. Betula occidentalis Hook.

River Birch

River birch is a multi-stemmed shrub or short tree, to 12 m (45 ft) tall, with dull gray to dark reddish-brown bark that is not separable into thin layers. The sharp toothed leaves, 2-5 cm (1-2 in) long, have ovate blades, mostly with blunt tips. The base of the blade is abruptly contracted into the petiole.

In keeping with its common name, river birch occurs almost exclusively in riparian environments and also on perennial seeps. From AK to CA (wholly e. of the Cascades) and east to Sask., SD, WY, CO, UT, NM, and AZ.

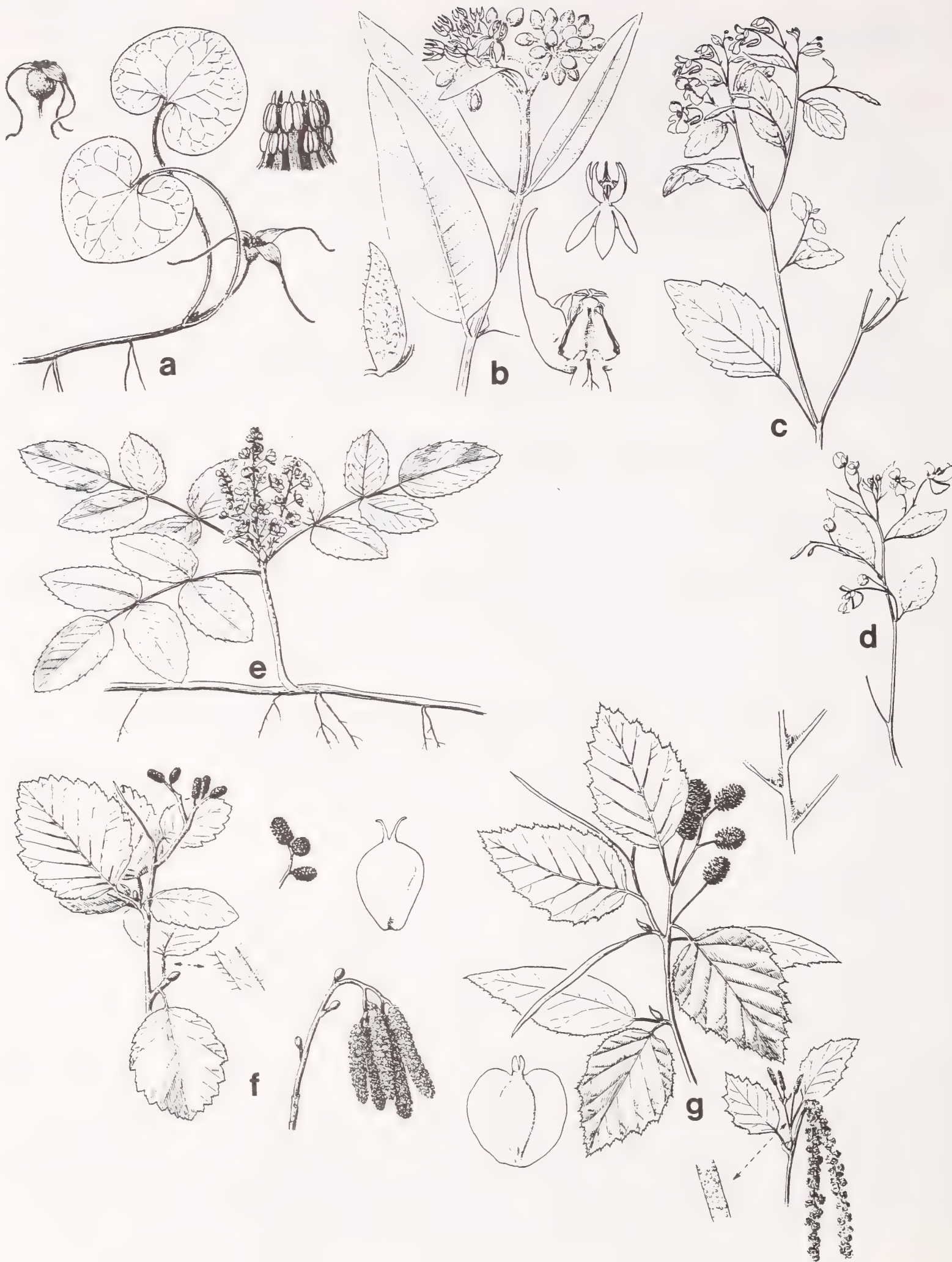
3. Betula papyrifera Marsh

Paper Birch

In our area paper birch is the only birch occurring often as a single-stemmed tree, to 15 m (50 ft) tall. Its twigs are dark brown, but in our area the bark of older stems is light gray to yellowish or even reddish and not the peeling, crisp white associated with this species in other locals. The narrowly ovate to rotund leaf blades, 4-7 cm (2-3 in) long, occasionally have heart-shaped bases and are abruptly short- acuminate with toothed margins.

Only small populations of paper birch are known along the streams flowing into the Bitterroot River in the northwest part of our area. The southernmost populations are believed to be those along Big Creek near Victor. Typically this is an early successional species in our moister coniferous forest, mostly of the foothill and lower montane zones. AK to e. Can., south to OR, CO, PA, and NC.

The atypical coloration of our trees may be due to hybridizing with B. occidentalis.



a. *Asarum caudatum* b. *Asclepias speciosa* c. *Impatiens aurella* d. *I. ecalcarata* e. *Berberis repens*
 f. *Alnus incana* g. *A. sinuata*

4. Betula alba L.

European White Birch, Cutleaf Birch

This species is a tall tree with white bark that peels off in thin layers. The leaves are deeply and irregularly sharp-toothed, wedge-shaped at the base, and long-tapered to a pointed apex.

White birch is a popular European horticultural species that seeds itself profusely and sometimes successfully into irrigated pastures in the lower Rattlesnake drainage. Our variety is dalecarlica Rehd. (Not illustrated).

BORAGINACEAE Borage Family

Members of this family are annual or perennial herbs with simple, usually alternate leaves and mostly bristly-hairy herbage. The flowers are most often borne in a spirally coiled, spikelike inflorescence that unwinds as the flowers mature. The flowers are bisexual with 5 united petals and (4)5 separate to united sepals. In many species the corolla consists of a lower narrow tube and an expanded upper portion called the limb. There are often small appendages (fornices) on the insides of the petals near the point where the tube and limb join. The flowers have 5 stamens and 1 style. The fruit is a dry capsule containing 4 nutlets.

Mature fruit is often necessary for reliable species identification in this family.

- | | | |
|-----|--|-------------------------------|
| 1. | Nutlets bearing distinct hooked or barbed prickles on the margins..... | 2 |
| 1. | Nutlets smooth or roughened but without marginal prickles..... | 4 |
| 2. | Flowers reddish purple, coarse weeds of disturbed areas..... | <u>Cynoglossum officinale</u> |
| 2. | Flowers blue or white..... | 3 |
| 3. | Nearly all flowers subtended by a bract; flower stalk erect in fruit; plants usually annual.... | <u>Lappula</u> |
| 3. | Only the lowest flowers subtended by a bract; flower stalk recurved in fruit; plants biennial or perennial..... | <u>Hackelia</u> |
| 4. | Fruiting calyx thickened and greatly enlarged, ultimately composed of 2 toothed segments up to 2 cm wide..... | <u>Asperugo procumbens</u> |
| 4. | Fruiting calyx not as above..... | 5 |
| 5. | Upper 2 corolla lobes distinctly longer than the lower 3, stamens protruding well beyond the mouth of the corolla..... | <u>Echium vulgare</u> |
| 5. | Corolla lobes of equal length..... | 6 |
| 6. | Corolla greenish-yellow, yellow or orange..... | 7 |
| 6. | Corolla blue or white..... | 8 |
| 7. | Plants annual, herbage usually bristly-hairy..... | <u>Amsinckia</u> |
| 7. | Plants perennial, herbage not bristly..... | <u>Lithospermum</u> |
| 8. | Flowers blue..... | 9 |
| 8. | Flowers white, sometimes with a bluish cast..... | 12 |
| 9. | Corolla limb flared upward at an oblique angle, corolla usually greater than 10 mm long..... | <u>Mertensia</u> |
| 9. | Corolla limb abruptly flared perpendicular to the tube, corolla usually less than 10 mm long..... | 10 |
| 10. | Plants perennial, low and mat forming, plants of high elevations..... | <u>Eritrichium nanum</u> |
| 10. | Plants annual or perennial, often small but not mat-forming, plants usually found at low elevations..... | 11 |
| 11. | Appendages at top of corolla tube (fornices) densely hairy; plants usually greater than 35 cm (14 in) tall..... | <u>Anchusa officinalis</u> |
| 11. | Fornices not hairy; plants usually less than 35 cm tall..... | <u>Myosotis</u> |
| 12. | Inner side of nutlet with a distinct groove (10X magnification)..... | <u>Cryptantha</u> |
| 12. | Inner side of nutlet smooth or with a ridge..... | 13 |
| 13. | Nutlets smooth and shining..... | <u>Myosotis</u> |
| 13. | Nutlets obviously roughened..... | 14 |
| 14. | Corolla greater than 4 mm long..... | <u>Lithospermum</u> |
| 14. | Corolla less than 4 mm long..... | <u>Plagiobothrys scouleri</u> |

Amsinckia Lehm. Fiddleneck

Species in this genus are taprooted annuals with bristly-hairy herbage. The small, bright yellow to orange flowers are borne in a spirally coiled, narrow inflorescence. Amsinckia is a genus of "weedy" species native to w North and South America. Identification is not possible without 10X magnification.

BORAGINACEAE

1. Appendages on the inside of the petals below the lobes (fornices) well-developed and hairy; stamens attached on bottom 1/2 of the corolla tube.....(1) A. lycopsoides
1. Fornices not well-developed or hairy; stamens attached on the top 1/2 of the corolla tube.....(2) A. menziesii

1. Amsinckia lycopsoides Lehm.

Tarweed fiddleneck

This species has simple or few-branched stems 10-60 cm (4-24 in) tall. Leaves are linear or oblong and up to 10 cm (4 in) long. The nutlets are 2.5-3.0 mm long, greenish to dark brown, and somewhat roughened.

This tarweed is locally common in moist, fertile soils of gardens and barnyards in the valley. East of the Cascades, B.C. to CA, east to MT and NV.

2. Amsinckia menziesii (Lem.) Nels. & Macbr.

Menzies' Fiddleneck

Menzies' fiddleneck has stems 15-70 cm (6-28 in) tall that are simple or many-branched. The leaves are lance-shaped or oblong and up to 12 cm (5 in) long. Nutlets are 2-3.5 mm long, greenish to black, and roughened.

This species is locally common in moist, fertile soils of gardens and barnyards in the valley. AK to CA, east to MT and NV.

Anchusa L. Bugloss

Anchusa officinalis L.

Common bugloss

Common bugloss is a taprooted perennial with 1-several stems 30-80 cm (12-32 in) tall. The petiolate lower leaves are lance-shaped and become smaller and lack petioles upward. The entire plant is stiff, spreading-hairy. The inflorescence usually consists of many narrow, spirally coiled branches. The bright blue flowers are funnel-shaped and 6-11 mm long. The roughened nutlets are 3-4 mm long.

This species is uncommon in our area. It has been collected along roadsides near Hamilton and Florence. Native to the Mediterranean region, introduced throughout much of the U.S.

Asperugo L. Madwort

Asperugo procumbens L.

Madwort

Madwort is an annual with weak, climbing or trailing stems up to 60 cm (2 ft) long. The lower leaves are petiolate and lance- to egg-shaped, the blade 3-11 cm (1-4 in) long. The upper leaves are smaller and without petioles. The stems and leaves are sparsely covered with fine, stiff bristles. The blue flowers are 2-3 mm long and borne on short, curved stalks from the base of the leaves. The coarsely toothed calyx has a prominent netlike pattern of veins and becomes enlarged to 1-2 cm wide in fruit. The nutlets, about 2.5 mm long, are smooth with a checkered pattern.

Madwort is uncommon in moist to dry disturbed habitats. Introduced from Eurasia, widespread in the n. U.S.

Cryptantha Lehm. Cryptantha, Miner's Candle

Members of this genus are annual, biennial, or perennial herbaceous species, usually with narrow leaves and hairy or bristly-hairy foliage. The flowers are borne in a series of spirally coiled, narrow branches or occasionally single in the leaf bases. The corollas are small and white with well-developed appendages inside below the lobes (fornices). The calyx segments are united only at the base. The nutlets are smooth or variously roughened.

Cryptantha is native to western North and South America. Annual species cannot be identified without mature fruit.

1. Plants biennial or perennial with tufted basal leaves.....2
1. Plants annual, basal leaves few and soon deciduous.....3
2. Corolla relatively large, the length across the expanded upper portion (limb) 8-12 mm; basal leaves often spoon-shaped with obtuse or indented tips.....(1) C. celosioides
2. Corolla smaller, the limb 4-8 mm wide; basal leaves usually lance-shaped with pointed tips.....(2) C. interrupta
3. Nutlets with scattered small bumps (10X magnification).....(4) C. ambigua
3. Nutlets smooth or very lightly roughened.....4
4. Groove on the back of the nutlet offset from the center.....(3) C. affinis
4. Groove on the back of the nutlet in the center.....5



a. *Betula glandulosa* b. *B. occidentalis* c. *B. papyrifera* d. *Amsinckia lycopsoidea* e. *A. menziesii*
 f. *Anchusa officinalis* g. *Asperugo procumbens*

BORAGINACEAE

5. Margins of the nutlet sharply angled.....(6) C. watsonii
5. Margins of the nutlet rounded.....(5) C. torreyana

Group I. This group contains 2 biennial and short-lived perennial species that are conspicuously hairy with 1-several relatively stout stems. The basal leaves are numerous and tufted. The stem leaves are reduced and few. The corollas are relatively large and have a yellow throat.

1. Cryptantha celosioides (Eastw.) Pays.

Miner's Candle

Miner's candle is a biennial or short-lived perennial, to 50 cm (20 in) tall, with or without a branched caudex. The basal leaves are lance- to spoon-shaped, usually rounded or indented at the tip. The length across the expanded, upper part of the corolla is 8-12 mm. The nutlets are 3-5 mm long and obviously roughened.

This species occurs in dry grasslands in the valley and montane zones in the northern part of our area. It is common on the hills around Missoula such as Mount Sentinel, Mount Jumbo and Waterworks Hill. B.C. to OR, east to Alta. ND, and NE.

2. Cryptantha interrupta (Greene) Pays.

Bristly Miner's Candle

[C. spiculifera (Piper) Pays.]

Bristly miner's candle is a perennial, very similar to Cryptantha celosioides. Basal leaves are lance-shaped and usually broadly pointed to rounded, or occasionally indented. The length across the expanded, upper part of the corolla is 4-8 mm. The nutlets are 2-4 mm long and obviously roughened.

The plant occurs in dry grasslands in the valley and montane zones on both sides of the Bitterroot Valley. WA to OR, east to Sask., MT, and NV.

Group II. The second group contains annuals with slender, simple or branched stems 5-30 cm (2-12 in) tall. The leaves are linear to narrowly oblong. The flowers are small and often surpassed by the stiff hairs of the calyx. The species can be distinguished only by differences in the texture and shape of the nutlets. The distribution of these species in our area is not well known.

3. Cryptantha affinis (Gray) Greene

Slender Cryptantha

Slender cryptantha has herbage with mainly short, appressed hairs as well as some longer, stiff ones. The nutlets are 2 mm long and smooth or very finely roughened.

This species is locally common in disturbed soil of grasslands and open forests in the valley zone throughout our area. East of the Cascades, B.C. to CA, east to MT and WY.

4. Cryptantha ambigua (Gray) Greene

Obscure Cryptantha

This plant usually has a branched stem and herbage covered with stiff spreading hairs. The nutlets are 1.2-2.0 mm long, very lightly roughened and have scattered and sometimes obscure bumps.

Obscure cryptantha occurs in disturbed soil of grasslands and open forests in the valley zone. It has been collected near Miller Creek south of Missoula and in Bitterroot Wildflower Area west of Hamilton. B.C. to CA, east to MT and CO.

5. Cryptantha torreyana (Gray) Greene

Torrey's Cryptantha

The plant has herbage with short, appressed hairs as well as stiff, spreading hairs. The nutlets are 1.5-2.3 mm long, smooth and shining to very finely roughened.

Torrey's cryptantha occurs in disturbed soil of grasslands and open forest in the valley zone. It has been collected near Missoula and Lolo. B.C. to CA, east to MT, WY, and UT.

6. Cryptantha watsonii (Gray) Greene

Watson's Cryptantha

Watson's cryptantha has leaves and stems with stiff, spreading hairs. The nutlets are 1.5-2.1 mm long and smooth with sharply angled margins.

Rare or uncommon in our area. It has been collected once along McClain Creek Road southwest of Lolo. WA to NV, east to MT and CO.

Cynoglossum L. Hound's Tongue

Cynoglossum officinale L.

Hound's Tongue

Hound's tongue is a taprooted perennial with single stems that are leafy to the top and more than 1 m (3 ft) tall. The lower leaves are long-petiolate and 10-30 cm (4-12 in) long with lance-shaped blades. The upper leaves are smaller and without petioles. The stem and leaves are covered with long spreading hairs. The inflorescence consists of 3-several narrow branches with flowers on short stalks that become



a. *Cryptantha celosioides* b. *C. interrupta* c. *C. affinis* d. *C. torreyana* e. *C. watsonii* f. *C. ambigua*

BORAGINACEAE

spreading in fruit. The flowers are a dull reddish-purple and about 1 cm across the top. The ovate nutlets are 5-7 mm long and densely covered with short, hooked prickles.

This species is common in disturbed areas, especially along logging roads and in heavily grazed pastures in the valley and montane zones throughout our area. Introduced from Europe, established throughout the U.S.

The abundant "sticky" burrlike fruits familiar to everyone are spread by livestock, recreationists, and hunters alike.

Echium L. Viper's Bugloss

Echium vulgare L.

Viper's Bugloss

Viper's bugloss is a taprooted biennial with single stems up to 70 cm (28 in) tall. The petiolate basal leaves are lance-shaped and 6-25 cm (2-10 in) long. The upper leaves become smaller and are without petioles. The stems and leaves are rough-hairy to bristly. The narrow inflorescence consists of numerous shortly coiled branches. The blue corollas are 12-20 mm long with the anther stalks protruding beyond the mouth. The 5-sided nutlets are about 2.5 mm long and slightly roughened.

This species is uncommon in our area. It has been collected along roadsides near Florence and Darby. Native of Europe, common throughout the U.S.

Eritrichium Schrad. Alpine Forget-me-not

Eritrichium nanum (Vill.) Schrad.

Alpine Forget-me-not

This is a dwarf, tufted perennial with a branched caudex and stems up to 5 cm (2 in) tall. The leaves are oblong and up to 5 mm long, more numerous at the base of the plant. The herbage is densely silvery-hairy. The compact inflorescence bears clear blue, fragrant flowers 4-8 mm across the corolla limb. The nutlets are smooth and glabrous.

Alpine forget-me-not is common in open, dry, rocky, windswept habitats in the alpine zone. It occurs on many of the high peaks of the Bitterroot Range including Lolo Peak, St. Joseph and St. Mary's peaks, Gash Point, Ward Mountain, and Trapper Peak. Circumboreal arctic-alpine, south in the Rocky Mountains to NM.

This is one of the most beautiful and well-known alpine species. Plants from our area are a particularly small form.

Hackelia Opiz. Stickseed, Wild Forget-me-not,

Members of this genus are taprooted biennial or perennial herbs with entire leaves. The inflorescence is composed of narrow, leafy branches that elongate in fruit. The flowers are blue or white, often with a yellow center. The appendages in the throat of the corolla are well-developed. The nutlets have prickles along the margins and sometimes over the entire surface.

- | | |
|---|--------------------------|
| 1. Flowers white..... | (3) <u>H. cinerea</u> |
| 1. Flowers blue with a yellow or white center..... | 2 |
| 2. Prickles on nutlets confined to the margins; basal leaves soon withering; flowers 4-7 mm wide across the top..... | (1) <u>H. floribunda</u> |
| 2. Prickles present on both the face and margins of the nutlet; basal leaves persistent; flowers usually 7-11 mm wide across the top..... | (2) <u>H. micrantha</u> |

1. Hackelia floribunda (Lehm.) Johnst.

Many-flowered Stickseed

This biennial is usually single-stemmed and 30-100 cm (1-3 ft) tall. The basal leaves are persistent or may wither early. The stem leaves are well-developed and 4-20 cm (1-8 in) long. The stem is covered with stiff spreading hairs. The inflorescence is narrow, the branches densely beset with flowers. The corollas are blue with a yellow center and 4-7 mm wide across the top. The nutlets are 3-4 mm long with prickles mostly confined to the margins and united only at the base.

Many-flowered stickseed occurs in moist or wet habitats in the montane zone. It has been collected along Miller Creek in the Sapphire Range, west of Stevensville in the Bitterroot Mountains, and near Painted Rock Reservoir. B.C. to CA, east to Sask. and NM.

2. Hackelia micrantha (Eastw.) J.L. Gentry [H. jessicae (McGregor) Brand]

Blue Stickseed

Blue stickseed is a perennial with several stems from a large taproot. The stems are 30-100 cm (1-3 ft) tall and covered with stiff, spreading hairs. The persistent basal leaves are up to 35 cm (14 in) long and covered with appressed hairs. Stem leaves are well-developed and numerous. The inflorescence is shorter and more open than in H. floribunda with the flowers clustered at the ends of branches. The

corollas are blue with a yellow or whitish center and usually 7-11 mm wide across the top. The nutlets are 3-4 mm long with few to several prickles on the body as well as on the margins.

This species occurs in moist to seasonally moist habitats from the montane to timberline zones. It has been collected in Rattlesnake Canyon north of Missoula and at elevations up to 2590 m (8,500 ft) in the Bitterroot Mountains south of Lost Horse Creek. B.C. to CA, east to Alta. and WY. (Not illustrated).

3. Hackelia cinerea (Piper) Johnst.

Gray's Stickseed

This perennial has 1-several stems up to 80 cm (32 in) tall that are appressed- as well as spreading-hairy. The persistent basal leaves are 5-20 cm (2-16 in) long and densely hairy. Stem leaves are mostly without petioles and are reduced upwards. The inflorescence is narrow. Flowers are white with a yellow center. The corolla is usually 7-12 mm wide across the top. The nutlets have marginal prickles that are united for 1/3-1/2 their length, forming a cup-like rim.

Gray's stickseed occurs in dry, open habitats such as talus slopes or open ponderosa pine forest in the valley and montane zones. It has been collected in the hills around Missoula and along the front of the Bitterroot Mountains from west of Lolo south to Painted Rock Reservoir. East of the Cascades in WA, ID, and W. MT.

Lappula Gilib. Stickseed

The species are taprooted annuals or rarely biennials, usually up to 40 cm (16 in) tall. The leaves are numerous, lance- or strap-shaped, and up to 6 cm (2 in) long. The basal leaves wither early. The herbage is densely hairy throughout. The inflorescence consists of few to several narrow branches that become elongated with age. Flowers are blue, rarely white. The fruits have 1-few rows of hooked prickles on the margin.

Members of this genus resemble the weedy species of Myosotis and Cryptantha.

- 1. Marginal prickles of nutlets in 2-3 rows, only slightly united at the base.....(2) L. echinata
- 1. Marginal prickles in 1 row, often united at the base.....(1) L. redowskii

1. Lappula redowskii (Hornem.) Greene

Western Stickseed

The stems of this species are solitary and often branched above. The flowers are 1.5-2.5 mm wide across the top, the corolla barely surpassing the calyx. Marginal prickles of the nutlets are in a single row, sometimes united at the base to form a cuplike border.

Western stickseed is common in disturbed, dry habitats in the valley and montane zones throughout our area. Native to Eurasia and W. North America.

2. Lappula echinata Gilib. (L. myosotis Wolf)

Bristly Stickseed

The 1-few stems of bristly stickseed often have wider leaves than L. redowskii. The flowers are up to 4 mm wide across the top. Marginal prickles of the nutlets are in 2-3 rows and are not united at the base.

This species occurs in the same habitat as L. redowskii but is less common. Native to Eurasia and perhaps W. North America.

Lithospermum L. Stoneseed, Gromwell, Puccoon

Species are annual or perennial herbs, sparsely to densely hairy, but never bristly. Flowers are borne in terminal, narrow, leafy branches or in the leaf bases. The corollas are yellow to white. The nutlets are mostly oval and smooth, pitted, or wrinkled.

- 1. Annual plants, flowers white or bluish white.....(1) L. arvense
- 1. Plants perennial, flowers bright or greenish yellow.....2
- 2. Flowers greenish yellow, the tube formed by the united petals 4-6 mm long, plants usually greater than 30 cm (12 in).....(2) L. ruderale
- 2. Flowers bright yellow, the tube of upper flowers 15-30 mm long, plants usually less than 30 cm tall, rare in our area.....(3) L. incisum

1. Lithospermum arvense L.

Field Gromwell

This species has 1-several simple or branched stems 10-70 cm (4-28 in) tall. Leaves are linear to narrowly lance-shaped in outline, usually without petioles, and 1-6 cm long. The flowers are borne in the leaf axils. The inflorescence is crowded at first, becoming open with age. Flowers are white, sometimes with a bluish cast. The limb is 2-4 mm wide. The nutlets are wrinkled and pitted, occasionally with scattered bumps.



a. *Cynoglossum officinale* b. *Echium vulgare* c. *Eritrichium nanum* d. *Hackelia floribunda*
 e. *Hackelia cinerea* f. *Lappula echinata* g. *L. redowskii*

This introduced plant is common in fields and disturbed pastures in the valley zone. Native of Eurasia, introduced in most of U.S.

2. Lithospermum ruderale Dougl.

Wayside Gromwell, Puccoon

This perennial has several stems up to 60 cm (2 ft) tall clustered on a woody taproot. The basal leaves are lacking or wither early. The numerous stem leaves are linear to narrowly lance-shaped and without petioles. Flowers are borne in small clusters at the base of the upper leaves. The corollas are greenish yellow and 7-13 mm wide across the top. The nutlets are smooth, gray, and shiny.

Puccoon is common in dry grasslands and open forests in the valley and montane zones. B.C. to CA, east to Alta. and CO.

The large taproot, which is said to have medicinal properties, was eaten by Native Americans.

3. Lithospermum incisum Lehm.

Yellow gromwell

Yellow gromwell is a perennial with 1-several stems, 5-30 cm (2-12 in) tall from a woody taproot. All the leaves are on the stem and are reduced upwards. They are linear to oblong, 2-6 cm long, and covered with short, appressed hairs. The flowers are crowded in the upper leaf axils. The corollas are bright yellow, trumpet-shaped, 15-30 mm long, and 10-15 mm wide across the top. The nutlets are gray, shiny, and sparsely pitted.

Collected only in dry grasslands near upper Birch Creek, southeast of Victor. Great Plains, adjacent Can. and Mex. west to B.C., MT, and UT.

The conspicuous flowers produced early in the season rarely bear fruit. Smaller, non-opening flowers that are produced later are usually fertile. By late spring and summer, the plants become more branched and leafy.

Mertensia Roth Bluebells

The members of this genus are perennial herbs with 1-several stems from a rhizome, caudex, or corm. The foliage is usually glabrous to sparsely hairy, but not bristly. The leaves are alternate and entire-margined. The inflorescence consists of 1-many drooping to erect clusters in the axils of leaves and terminating the branches. Flowers are blue. The petals are united almost their full length. The corolla, consisting of a narrow tube and an expanded limb, is trumpet- to bell-shaped. The appendages at the base of the limb (fornices) are usually apparent. Nutlets are generally roughened.

- | | | | |
|----|--|-----|------------------------|
| 1. | Corolla flared from the base, bell-shaped..... | (5) | <u>M. bella</u> |
| 1. | Corolla with a well-defined tube and limb..... | 2 | |
| 2. | Plants usually greater than 30 cm (12 in) tall..... | 3 | |
| 2. | Plants usually less than 30 cm tall..... | 4 | |
| 3. | Stem leaves, except the lowest, usually without petioles; corolla limb mostly 0.8-1.2 times as long as the tube..... | (1) | <u>M. ciliata</u> |
| 3. | Stem leaves mostly petiolate; corolla limb usually 1.2-1.6 times as long as the tube..... | (2) | <u>M. paniculata</u> |
| 4. | Stems from a tuberous-thickened, shallow root..... | (4) | <u>M. longiflora</u> |
| 4. | Stems clustered on a stout branched caudex..... | 5 | |
| 5. | Anther filaments short, up to 1 mm long..... | (6) | <u>M. perplexa</u> |
| 5. | Anther filaments 1.5-3 mm long..... | (3) | <u>M. oblongifolia</u> |

Group I. The first group contains two tall species, 40-150 cm (1-5 ft) high and generally with several stems. These plants occur in moist to wet habitats.

1. Mertensia ciliata (Torr.) G. Don

Mountain Bluebells

Mountain bluebells has numerous stems from a branched, woody caudex or stout rhizome. The leaves are elliptic to egg-shaped. The basal and lower ones are petiolate, while the upper ones lack petioles and are gradually reduced. The inflorescence is branched and open. The corolla is 10-17 mm long, the limb usually 0.8-1.2 times as long as the tube. The style often protrudes beyond the mouth of the corolla.

Common in moist habitats in the montane and subalpine zones in the Sapphire Range and southern Bitterroot Mountains. In our area it occurs well below timberline. OR to CA, east to MT, CO, and NM.

2. Mertensia paniculata (Ait.) G. Don

Tall Bluebells

This species is similar to M. ciliata, but the basal leaves are more-or-less heart-shaped, and the stem leaves usually have petioles. The corolla is 9-16 mm long, the limb usually 1.2-1.6 times longer than the tube. The style often protrudes beyond the mouth of the corolla.



a. *Lithospermum arvense* b. *L. ruderale* c. *L. incisum* d. *Mertensia ciliata* e. *M. paniculata*

Tall bluebells is infrequent in moist habitats from the valley occasionally to the timberline zone. AK to OR, east to Que. and IA.

An exceptionally tall ecotype occurs near the Bitterroot River, south of Lolo, while an unusually small specimen was collected near timberline on the southern Selway-Bitterroot Divide. There are no collections from the Sapphire Range.

Group II. The second group contains species that are less than 30 cm (1 ft) tall and common or locally common from the valley to the subalpine zones.

3. *Mertensia oblongifolia* (Nutt.) G. Don

Leafy Bluebells

Leafy bluebells has many erect stems arising from stout black roots. The numerous basal leaves are lance-shaped to elliptic and 2-15 cm (1-6 in) long with a well developed petiole. The ample stem leaves are gradually reduced upwards. Flowers are clustered in a drooping inflorescence at the top of the unbranched stems. The tube of the corolla is glabrous inside and 1.3-2 times as long as the limb. Anther filaments are 1.5-4 mm long. The style is approximately the length of the corolla.

This is the most common and widespread species of *Mertensia* in our area. It occurs in moist or seasonally moist, open or partially shaded habitats from the valley to the subalpine zones. East of the Cascades, WA to NV, east to MT and WY.

4. *Mertensia longiflora* Greene

Small Bluebells

This species is usually single-stemmed from a shallow, tuberlike root. Basal leaves are absent. The stem leaves are oblong, 2-6 cm long, rounded or obtuse at the tip, and without petioles. Flowers are clustered in a drooping inflorescence at the top of the unbranched stems. The tube of the corolla is glabrous within and usually 2-3 times as long as the limb. The anther filaments are 1.5-3 mm long. The style is approximately equal to the corolla in length.

Small bluebells is locally common in vernal moist meadows of the Bitterroot Wildflower Area west of Hamilton. East of the Cascades, B.C. to n. CA, east to ID and MT.

Group III. The third group consists of species, usually less than 30 cm (1 ft) tall, that are rare in our area.

5. *Mertensia bella* Piper

Oregon Bluebells

Oregon bluebells has solitary stems from a cormlike root. The basal leaves are absent. The sparsely distributed stem leaves have thin, veiny, ovate blades, 3-8 cm (1-3 in) long, with progressively reduced petioles. The open inflorescence consists of few to several branches with the flowers clustered toward the ends. The corolla is bell-shaped and 6-10 mm long. The style is slightly shorter than the corolla.

Occurs on moist to wet, open slopes in the lower subalpine zone near the Idaho Border southwest of Lolo. This is the only location for this plant in Montana. Southwest OR and rare in central ID and adjacent MT.

6. *Mertensia perplexa* Rydb.

Obscure Bluebells

[*M. viridis* (A. Nels.) A. Nels.]

In this species numerous partially erect stems, 5-25 cm (2-10 in) tall, arise from a branching caudex. The basal leaf blades are lance-shaped to elliptic and 1-5 cm long with well-developed petioles. The numerous stem leaves are mostly without petioles and are gradually reduced upwards. Flowers are clustered in a terminal inflorescence. The corolla is 9-14 mm long and has a ring of hairs near the base of the tube. Anther filaments are usually less than 1 mm long. The style is shorter than the corolla.

Obscure bluebells is common in moist to dry meadows near timberline in the Anaconda-Pintlar Range. Southwest MT south to CO.

M. viridis, which differs by having anther filaments 1.5-3 mm long, is common just to the south and may eventually be found in our area.

Myosotis L. Forget-me-not

Members of this genus are annual to perennial herbs with glabrous or hairy but not bristly foliage. The flowers are borne in narrow, terminal, spirally coiled branches or in the axils of the upper leaves. The corollas are blue or white and divided into a distinct tube and limb. The nutlets are smooth and shiny.

1. Plants lax with weak stems, often curved at the base; occurring in wet soil or standing water; calyx without spreading hairs.....2
1. Plants erect, occurring in moist to dry habitats; calyx with spreading or curved hairs.....3
2. Corolla limb 2-5 mm wide; stems not rooting where they are in contact with the ground.....(1) *M. laxa*
2. Corolla limb 5-10 mm wide; stems rooting along the ground.....(2) *M. scorpioides*



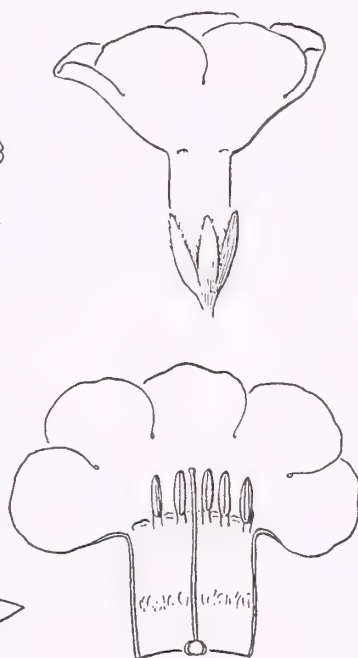
a



b



c



d

a. *Mertensia oblongifolia* b. *M. longifolia* c. *M. perplexa* d. *M. bella*

3. Perennial plants of montane meadows; corolla limb 4-8 mm wide.....(3) M. sylvatica
3. Annual or biennial species of disturbed habitats; corolla limb 1-4 mm wide.....4
4. Corolla white; two lobes of calyx lobes longer than other three.....(6) M. verna
4. Corolla blue; calyx lobes equal.....5
5. In fruit, flower stalks equal or longer than calyx, corolla limb 2-4 mm wide; uncommon.....(5) M. arvensis
5. In fruit, flower stalks shorter than the calyx, corolla limb 1-2 mm wide; common.....(4) M. micrantha

Group I. The first group contains biennial or perennial species with relatively large flowers that resemble the well-known horticultural forget-me-nots. The flower buds are often pink, and the flowers are pale blue with a yellow center. The stalks of mature fruits are equal to or longer than the mature calyx.

1. Myosotis laxa Lehm.

Smaller Forget-me-not

This species is a biennial or short-lived perennial with weak stems, 10-40 cm (4-16 in) long, that are curved or reclined at the base, but not stoloniferous. The leaves are narrowly oblong or lance-shaped and 1.5-8 cm (1-3 in) long, the upper ones without petioles. The herbage is sparsely hairy. The corolla limb is 2-5 mm wide.

This forget-me-not is common in wet soil or standing water in the floodplain of the Bitterroot River. Circumboreal, south to ne. U.S. and CA; Chile.

2. Myosotis scorpioides L.

Common Forget-me-not

This fibrous-rooted perennial has stems up to 60 cm (2 ft) tall that are creeping at the base and produce runners (stolons). The leaves are narrowly lance-shaped to elliptic and up to 8 cm (3 in) long, mostly without petioles. The herbage is sparsely hairy. The limb of the corolla is 5-10 mm wide.

This species occurs in wet soil or standing water in the valley zone. It has been collected in sloughs of the Bitterroot River, south of Lolo and in Rattlesnake Creek Valley, north of Missoula. Introduced from Europe and widespread in North America.

3. Myosotis sylvatica Hoffm.

Wood Forget-me-not

[M. alpestris Schmidt]

Wood forget-me-not is a fibrous-rooted perennial with 1-many stems up to 40 cm (16 in) tall from a branched caudex. The basal leaves are narrowly lance-shaped to elliptic and up to 13 cm (5 in) long including the petiole. The herbage is covered with stiff hairs. The corolla limb is 4-8 mm wide, and the calyx lobes are longer than the united portion. In fruit, the length of the flower stalks is equal to the length of the calyx.

In our area, this species occurs in moist meadows in the montane zone. It is known from Tin Cup Creek Meadows west of Darby at an elevation of 1160 m (3,800 ft) and from Marshall Creek, north of Missoula. Circumboreal south to ID, WY, and SD.

Our plants belong to var. alpestris (Schmidt) Koch, which occurs at high elevations in many of Montana's mountain ranges. The cultivated forget-me-not belongs to the European var. sylvatica.

Group II. The second group contains annual or biennial species with relatively small, white or blue flowers. The herbage is usually densely stiff-hairy. They occur mostly in disturbed, relatively dry habitats.

4. Myosotis micrantha Pall.

Slender Forget-me-not

Slender forget-me-not is an annual, mostly branched from near the base, and up to 20 cm (8 in) tall, though usually much smaller. The leaves are lance-shaped and generally less than 2 cm long. The limb of the tiny, bright blue corollas is less than 2 mm wide. In fruit, the flower stalks are shorter than the calyx.

This species is common in dry, open, often disturbed habitats in the valley zone throughout our area. It is introduced from Eurasia and is now established throughout much of n. U.S. and adjacent Can.

5. Myosotis arvensis (L.) Hill

Field Forget-me-not

This is a fibrous-rooted annual or biennial with stems up to 40 cm (16 in) tall. The lower leaves are lance-shaped and up to 6 cm (2 in) long. Flowers are blue. The corolla limb is 2-4 mm wide. In fruit, the flower stalks are equal to or longer than the calyx.

Field forget-me-not is uncommon in our area. It has been collected in gardens and in Greenough Park, north of Missoula. Introduced from Europe, commonly established in e. U.S., Can., and occasionally elsewhere.



a. *Myosotis laxa* b. *M. scorpioides* c. *M. sylvatica* d. *M. micrantha* e. *M. arvensis*

6. Myosotis verna Nutt.

Early Forget-me-not

This is an annual species with simple or branched stems up to 40 cm (16 in) tall. The lower leaves are lance-shaped and up to 5 cm (2 in) long including the short petiole. The calyx is asymmetrical and stiffly hairy. It appears large compared to the small, white flowers. The corolla limb is 1-2 mm wide. In fruit, the flower stalks are equal to or smaller than the calyx.

This plant has been collected at Lolo Hot Springs and most recently just west of Stevensville by W. Albert. Native to e. U.S. and adjacent Can., also from B.C. to OR and ID; probably introduced in our area.

Plagiobothrys F. & M. Popcorn Flower

Plagiobothrys scouleri (H. & A.) Johnst.

Scouler's Popcorn Flower

This is a taprooted or fibrous-rooted annual with 1-numerous prostrate, ascending, or nearly erect stems up to 20 cm (8 in) long. Basal leaves are essentially absent. The stem leaves are linear and up to 6 cm (2 in) long, the lower ones opposite. The herbage is sparsely covered with short hairs. The small flowers are borne in a narrow, terminal inflorescence that is leafy at the base and elongates with age. The corollas are white with a yellow center and a limb 1-4 mm wide. The nutlets are egg-shaped and 1-2 mm long with a roughened, bumpy, and sometimes bristly surface.

Scouler's popcorn flower is one of our most common native annuals. It occurs in open or shaded habitats which mostly have heavy, often compacted soil and are wet in the spring but dry by summer. It is common in the valley and montane zones. B.C. to CA, east to NM and the Great Plains.

Our plants are var. penicillatus (Greene) Cronq.

CACTACEAE Cactus Family

Opuntia Mill. Prickly Pear, Cholla

Opuntia fragilis (Nutt.) Haw.

Jump Cactus, Brittle Prickly Pear

Plants of jump cactus are mostly prostrate and mat-forming with stems up to 10 cm (4 in) tall. The joints of the stem are nearly round and are easily detached. They bear long spines as well as short bristles. The flowers are 3-5 cm (1-2 in) long with numerous stamens and yellow petals. The fruit is about 2 cm long, pear-shaped, and sparsely spiny.

This species is infrequent on dry grassland slopes in the foothills of the Sapphire Range and on the hills immediately north and west of Missoula. B.C. to CA, east to the Great Plains.

CALLITRICHACEAE Water Starwort Family

Members of this family are small annual or perennial herbs with slender, usually lax stems. The leaves are simple, entire, and opposite or whorled. The minute flowers are borne in the axils of the leaves and are generally unisexual. Sepals and petals are lacking. The fruit is small and 4-lobed, splitting into 4 sections upon maturity. These inconspicuous plants occur in standing water or drying mud.

Callitriche L. Water Starwort

Members of this genus have the characters of the family. The fruits are essential for identification.

1. Fruit conspicuously winged around the entire margin.....(2) C. stagnalis
1. Winged margins of fruit inconspicuous or absent.....2
2. Leaves linear; flower bracts absent.....(5) C. hermaphrodita
2. Upper leaves often broader; flower bracts usually present.....3
3. Fruit sections 1/5-1/3 longer than broad; fruits usually with slight winged margin on top.....(3) C. verna
3. Fruit sections about as long as broad, winged margins absent.....4
4. Fruits usually widest above the middle; floating or emergent leaves ovate and often more than 5 mm wide.....(1) C. heterophylla
4. Fruits usually more nearly round; floating or emergent leaves nearly linear, less than 5 mm wide.....(4) C. anceps

CAMPANULACEAE

1. Callitriche heterophylla Pursh

Common Water Starwort

The emersed leaves are linear and 0.5-2.5 cm long. The emergent and floating leaves are egg-shaped, 3-nerved, and up to 1 cm wide. Flowers are subtended by bracts. The sections of the fruits are egg-shaped and widest above the middle, without winged margins.

This species is common in shallow water and drying mud of ponds, rivers and streams, and irrigation ditches in the valley zone throughout our area. Greenl. and North and South America.

2. Callitriche stagnalis Scop.

Pond Water Starwort

The leaves of pond water starwort are linear and 1-nerved to egg- or spoon-shaped and 3-nerved. The flowers are subtended by bracts. The fruit sections are oval in outline and wing-margined all around.

This species occurs in aquatic to terrestrial habitats. It has been collected in the area around Como Lake south of Hamilton. Europe and coastal North America.

3. Callitriche verna L.

Spring Water Starwort

[C. palustris L.]

This starwort has submersed leaves that are 1-nerved, linear, and up to 2 cm long. The floating and emergent leaves are spoon-shaped, 3-nerved, and up to 4 mm broad. Flower bracts are present. The fruit sections are egg-shaped and widest above the middle, with an inconspicuous winged margin above.

Spring water starwort has been found along the Bitterroot River near the confluence with Bass Creek. Eurasia and North America north of Mex.

4. Callitriche anceps Fern.

Two-edged Water Starwort

The leaves of this species are mostly linear and relatively crowded. Flower bracts are inconspicuous or absent. The fruit sections are round or oblong without winged margins.

We have one collection from the southwestern part of our area. Common in e. U.S., scattered in the west.

5. Callitriche hermaphroditica L.

Northern Water Starwort

This plant has tender stems up to 30 cm (12 in) long. The 1-nerved, linear leaves clasp the stem and are inconspicuously white-margined, notched at the tip, and 5-20 mm long. The orbicular fruit has narrow winged margins at the top and shallow pits on the faces. The flowers and fruits lack small, green bracts at the base. The styles fall early from the fruit.

Northern water starwort has been collected in a shallow slough near Stevensville, and may be more widespread. Throughout much of North America; Europe. (Not illustrated).

CAMPANULACEAE Harebell Family

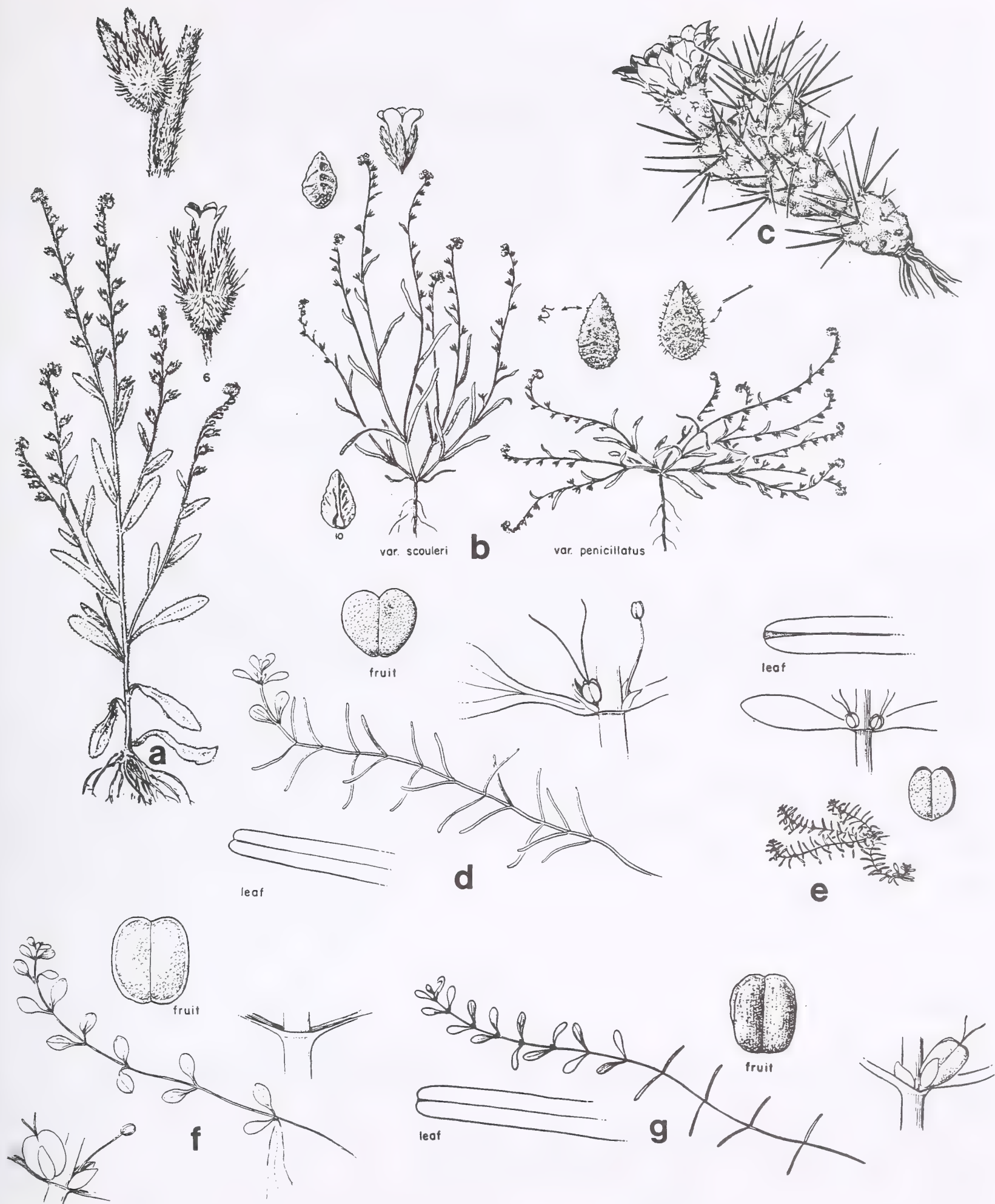
Members of this family are annual, biennial, or perennial (ours) herbs with simple and alternate leaves. The flowers have 5 sepals and 5 united petals. They are regular (with radial symmetry) or irregular (with bilateral symmetry). The fruit is a capsule (ours) or occasionally a berry.

- | | | |
|----|---|-------------------------------|
| 1. | Plants perennial from rhizomes and a branched caudex..... | <u>Campanula</u> |
| 1. | Plants annual with a small ephemeral root system..... | 2 |
| 2. | Plants of wet habitats, stems slender and lax..... | <u>Heterocodon rariflorum</u> |
| 2. | Plants of dry habitats, stems erect..... | <u>Triodanis perfoliata</u> |

Campanula L. Harebell, Bellflower

All our species are alternate-leaved perennials from rhizomes. The flowers are tubular, bell- or cup-shaped and borne on stalks in a narrow, 1- to many-flowered inflorescence. The corolla is usually blue to occasionally white. The stigma is 3-lobed. The fruit is a dry capsule.

- | | | |
|----|---|-----------------------------|
| 1. | Plants introduced garden weeds, usually greater than 50 cm (20 in) tall with many flowers per stem..... | (4) <u>C. rapunculoides</u> |
| 1. | Native species, usually less than 50 cm tall, flowers 1- few..... | 2 |
| 2. | Corolla usually greater than 15 mm long, seed capsules nodding..... | (1) <u>C. rotundifolia</u> |
| 2. | Corolla usually less than 15 mm long, seed capsules erect..... | 3 |
| 3. | Foliage lightly rough to the touch; leaves without long hairs on the lower margin..... | (3) <u>C. scabrella</u> |
| 3. | Foliage smooth; lower leaves with long hairs on the lower margin..... | (2) <u>C. parryi</u> |



a. *Myosotis verna* b. *Plagiobothrys scouleri* c. *Opuntia fragilis* d. *Callitriche heterophylla*
 e. *Callitriche anceps* f. *C. stagnalis* g. *C. verna*

CAMPANULACEAE

1. Campanula rotundifolia L.

Scotch Harebell

Scotch harebell has simple stems up to 30 cm (1 ft) tall from branching rhizomes. The basal and lower stem leaves often wither early. They have a petiole and a toothed, egg-shaped or round blade up to 2 cm long. Upper stem leaves are usually linear in outline and up to 8 cm (3 in) long. The erect or nodding flowers are 1.5-3.0 cm long and few to many in an open inflorescence. The nodding capsule is 5-8 mm long and opens near the base.

Common in open habitats in the foothills of the non-granitic northern Bitterroot Mountains and Sapphire Range. The plant is more sparsely distributed in shaded sites in all zones throughout our area. Circumboreal, south to Mex., TX, and CA.

Plants growing on near-neutral or calcareous soils are generally taller and have larger flowers than those on granite-derived soils.

2. Campanula parryi Gray

Idaho Harebell

This species is similar to Campanula rotundifolia, but the basal and lower stem leaves are elliptic in outline with entire margins and long hairs toward the base and on the short petiole. The blue corolla is 9-15 mm long. The erect seed capsule is 7-11 mm long and opens near the top.

Idaho harebell occurs in moist meadows and open forests, often on mesic north slopes, in granitic-derived soils in the montane to alpine zones in the Bitterroot Mountains and Sapphire Range. Wenatchee Mountains of central WA, central ID, and adjacent MT south to AZ and NM.

Our plants are var. idahoensis McVaugh. A small, single-stemmed, 1-flowered form of this species is common on the summit of Lolo Peak, on the saddle between the Heavenly Twins, and on Sweeney Peak in the Bitterroot Mountains. Sweeney Peak is also the location of a white-flowered population.

4. Campanula scabrella Engelm.

Rough Harebell

Rough harebell has 1-several stems up to 6 cm (3 in) tall from a taproot and branched rootcrown. The basal leaves are entire-margined, lance-shaped, and up to 4 cm long. The stem leaves are linear and reduced upwards. The foliage is densely covered with short, spreading hairs and appears grayish-green. The 1-5 erect flowers are 6-12 mm long and typically pale blue, but vary from deep blue to nearly white. The style is as long as the corolla. The seed capsule is 5-7 mm long and opens near the top.

Common in dry, rocky habitats, such as fellfields and fractured bedrock, in the upper subalpine to alpine zones in the Bitterroot Mountains. From Sweeney Peak, east of Stevensville, it becomes increasingly more common southward. Cascades of WA to CA and in ID and W. MT.

The largest population with the most variation in flower color occurs on a fellfield west of Tamarack Lake at 2800 m (9,200 ft).

5. Campanula rapunculoides L.

Creeping Bellflower

Creeping bellflower is a coarse perennial with unbranched stems, 30-100 cm (1-3 ft) tall, from a taproot and a much-branched caudex. The numerous petiolate basal leaves are broadly lance-shaped, toothed on the margins, and rounded to heart-shaped at the base. The stem leaves become sessile and reduced upwards. The herbage is glabrous to pubescent. The numerous blue flowers are borne in narrow, 1-sided, terminal branches. The corollas are bell-shaped and 1.5-3.5 cm long. The seed capsule is cup-shaped and about 7 mm long, opening at the base.

This plant occurs along the Bass Creek Trail at the mouth of the canyon. Introduced from Europe, common in e. U.S., sporadic in the west.

Creeping bellflower has invaded many gardens in Missoula and is difficult to eradicate. The taproot is carrot-shaped and edible. (Not illustrated).

Heterocodon Nutt. Heterocodon

Heterocodon rariflorum Nutt.

Heterocodon

This small annual has lax stems less than 10 cm (4 in) tall. The toothed leaves are nearly round in outline, up to 1 cm long, and without petioles. The herbage is glabrous or with short, stiff hairs on the leaf margins and stem angles. The blue flowers are 3-6 mm long and bell-shaped. They are borne on short stalks, opposite leaflike bracts in a narrow inflorescence terminating the stem. The fruit is short and broad and opens at the base.

In our area, heterocodon is rare in wet soil in the montane and subalpine zones. It has been collected in the Bitterroot Mountains in seeps above Chaffin Creek Trail at 3130 m (7,000 ft) and above Bear Creek Falls at 1280 m (4,200 ft). B.C. to CA, east to MT and WY.

Triodanis Raf. Venus' Looking-glass

Triodanis perfoliata (L.) Nieuwl.

Venus' Looking-glass

This annual species has erect, simple to sparsely branched stems up to 60 cm (2 ft) tall. The nearly round leaves and bracts clasp the stem and are toothed and up to 3 cm long. The foliage is rough to the

touch and often spreading-hairy below. The flowers are without stalks and are borne singly at the base of the leaves and bracts, nearly to the bottom of the stem. The corollas are blue to violet and 8-13 mm long. The capsules are oblong, 4-10 mm long, and open near the top.

Venus' looking-glass is uncommon in small disturbed areas of grasslands in the valley zone. It has been collected once on Mount Sentinel, east of Missoula. U.S. and adjacent Can. and Mex.; introduced in Europe.

CANNABINACEAE Hemp Family

Cannabis (Tourn.) L. Marijuana, Indian hempCannabis sativa L.

Marijuana, Indian hemp

Marijuana is an unbranched, coarse, and aromatic annual (in our area) growing to at most 180 cm (70 in), a fraction of its potential height. Lower stem leaves are opposite and the upper ones are alternate. Leaves are petiolate and palmately compound with 3-9 leaflets; they are lance-shaped to elliptic, coarsely toothed, long-tapered to a pointed apex, rough on the upper surface, and finely hairy beneath. Male and female flowers are occur on separate plants. Small, green flowers are borne in drooping inflorescences (male flowers) or short, erect, and dense packed spikes (female flowers) originating in axils of upper stem leaves. Fruit is an achene enclosed in the calyx and covered by a persistent bract.

Native to Asia, marijuana was cultivated in Europe for fiber (hemp) and seeds (hemp-butter, oil); now cultivated (illegally) for the euphoria-inducing properties of its herbage. (Not illustrated).

CAPPARIDACEAE Caper Family

Cleome L. BeeplantCleome serrulata Pursh

Rocky Mountain Beeplant

This species is an erect, to 1 m (40 in) tall, freely branched, showy annual forb with herbage ranging from glabrous to sparsely long-hairy. Leaves are alternate and divided into 3 lance-shaped, entire leaflets that are longer than the petioles. Numerous reddish-purple to pink, stalked flowers are arranged in prominently bracteate and dense, narrow, terminal inflorescence. Sepals of the 4-lobed calyx are basally united, whereas the 4 petals are separate, to 11 mm long, and abruptly narrowed to a 1 mm long claw. 6 stamens extend much beyond the petals. Fruits are long-stalked, pendulous capsules, linear to lance-shaped in outline.

This plant occurs mostly on disturbed substrates of valley and foothill zones (roadsides, railroad right-of-ways). From e. WA east to Sask. and south to CA, AZ, and NM.

CAPRIFOLIACEAE Honeysuckle Family

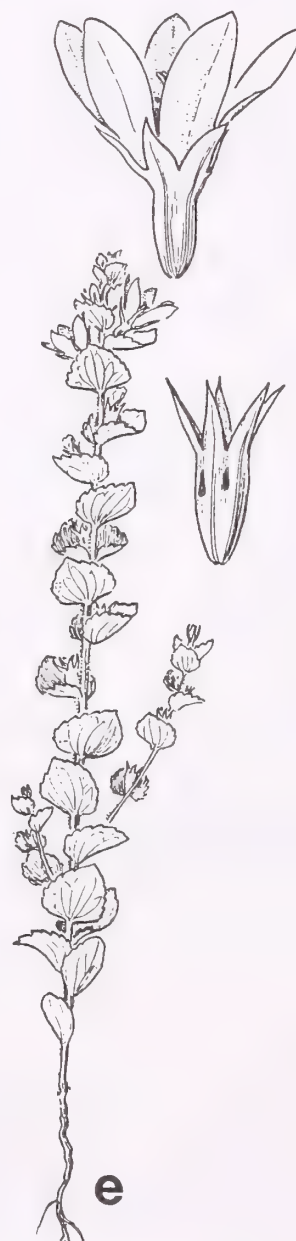
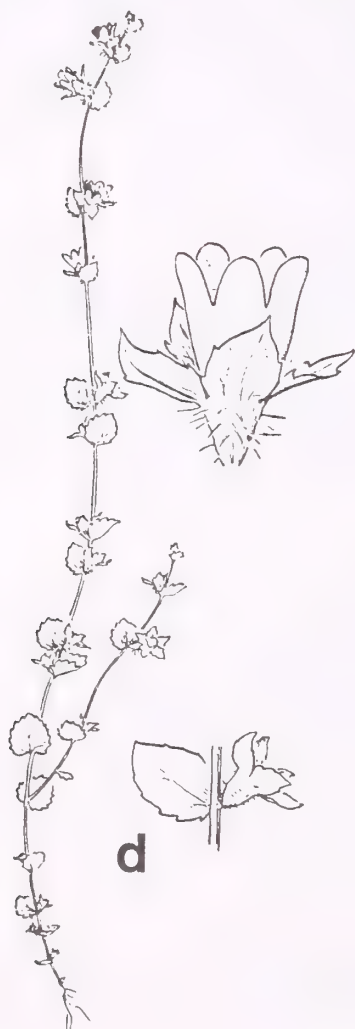
Members of this family are shrubs or woody vines with opposite leaves. The fruits are a fleshy berry or a dry capsule (as in Linnaea borealis).

- | | | |
|----|--|-----------------------|
| 1. | Plants trailing on ground, <10 cm (4 in) high; paired flowers nodding on a long peduncle..... | <u>Linnaea</u> |
| 1. | Plants upright or if decumbent or twining then >10 cm high; flowers not as above..... | 2 |
| 2. | Leaves pinnately divided (compound)..... | <u>Sambucus</u> |
| 2. | Leaves not divided (simple)..... | 3 |
| 3. | Leaf margins with serrations, sharp-pointed teeth; fruit with 1 seed..... | <u>Viburnum</u> |
| 3. | Leaf margins entire or sinuately lobed, not serrated; fruit with >1 seed..... | 4 |
| 4. | Corolla irregular (not radially symmetrical) with either 2 lips or spurred or swollen on one side; fruit with more than two seeds..... | <u>Lonicera</u> |
| 4. | Corolla regular (radially symmetrical), merely bulged on middle of one side; fruit with 2 hard seeds..... | <u>Symphoricarpos</u> |

Linnaea L. TwinflowerLinnaea borealis L.

Twinflower

Twinflower has long, slender, trailing, woody stems ("runners") from which numerous stems, less than 10 cm (4 in) tall, arise at frequent intervals. The "evergreen" leaves, 8-25 mm long, are short-petiolate, elliptic to egg-shaped, shallowly-toothed to entire, and leathery. The stem is forked at the summit, bearing 2 short-stalked, nodding, pink, bell-shaped flowers. These emanate a unique and piquant fragrance that is most intense on summer evenings.



a. *Campanula rotundifolia* b. *C. parryi* c. *C. scabrella* d. *Heterocodon rariflorum* e. *Triodanis perfoliata*

Found throughout our area from the montane to lower subalpine zones, twinflower is especially abundant in the deep, narrow canyons of the Bitterroot Mountains, where it is associated with conifer-shaded and moss-covered sites that also support Pyrola spp., Cornus canadensis, Clintonia uniflora, and Chimaphila umbellata. Circumpolar, south to CA, NM, IN, and WV.

Lonicera L. Honeysuckle

This genus is composed of shrubs and woody vines with entire, opposite leaves (upper leaf pair fused in vines). Inflorescences are borne as either 2-flowered axillary stalks or terminal clusters in which the uppermost flower blooms earliest. Fruits are fleshy, several-seeded, inedible berries.

1. Flowers mostly in terminal clusters; vines or scrambling shrubs; stems apparently passing through terminal leaves(5) L. ciliosa
1. Flowers paired in leaf axils; upright shrubs; terminal leaves not perfoliate.....2
2. Bracts subtending flower at least 5 mm wide; moist to wet woods and thickets.....(1) L. involucrata
2. Outer bracts at the top of the peduncle narrow and mostly small, inconspicuous and < 5 mm wide.....3
3. Inner bracts fused to form a cup which encloses the two ovaries or fruits.....(3) L. caerulea
3. Inner bracts inconspicuous or lacking, not enclosing the easily observed fruits.....4
4. Branches with a solid white pith; usually only linear bracts obvious at ovary base....(2) L. utahensis
4. Branches having hollow pith; bracts both linear and short and broad.....(4) L. tatarica

Group I. Only a single species, the "black twinberry bush", belongs here. It is showy and distinct, not appearing to be a honeysuckle without careful inspection.

1. Lonicera involucrata (Rich.) Banks

Twinberry

This shrub is 0.5-4 m (1.5-12 ft) tall and has quadrangular young twigs and short-petiolate, elliptic to egg-shaped and glabrous (upper surface) leaves that abruptly taper to a point. Paired, yellow, glandular-pubescent flowers are borne on stalks, 5-50 mm long, arising from leaf axils. They are subtended by 2 pairs of unlike bracts that are green at first but become purplish-red and reflexed at maturity. The 2 almost round berries are glossy blue-black.

This honeysuckle is common from the major valleys to the subalpine zone, always in very moist to wet soils and usually associated with toeslopes and riparian areas. From AK south to CA and Mex., east to MT and NM and irregularly to MI and Que.

Shrub height in our area barely exceeds 2 m (7 ft), and it decreases, as does the branching, with increasing elevation.

Group II. Shrubs included here have rounded or blunt leaf tips. Bracts at the peduncle's summit are small and narrow to nearly nonexistent. The twin sets of berries are bright red. These shrubs look like typical, garden "bush-honeysuckles."

2. Lonicera utahensis Wats.

Red Twinberry, Utah Honeysuckle

In our area this shrub's height does not exceed 2 m (7 ft). It is profusely branched with elliptic to egg-shaped or oblong leaves blunted to broadly rounded at the tip. The lower pair of floral bracts is very small (ca. 3 mm), and the upper pair is even smaller. The light yellow flowers open in early May at lower elevations.

Utah honeysuckle is widespread in our area, from the montane to mid-subalpine zones usually on moderately to densely wooded slopes that are only vernal moist. More uncommonly it occurs in shrubfields and riparian stringers. From s. B.C. east to Alta. and south to CA, MT, WY, and UT.

Its flowers constitute an important food source for early-arriving hummingbirds, but the red berries are not consumed by any birds.

3. Lonicera caerulea L.

Sweet-berry Honeysuckle

When growing to the same height, this species may superficially resemble L. utahensis, but on the average it is much smaller, mostly less than 0.5 m (1.5 ft) tall. Good field characters are the nearly equal lengths of tube and lobes (in L. utahensis the tube is appreciably longer) and the distinctly longer (6-80 mm), persistent, paired bracts subtending each flower. The sparse fruits are red.

Occurs in the Bitterroot, Rattlesnake and Sapphire Ranges in wet, often Carex scopulorum-dominated, subalpine meadows and riparian stringers. It sometimes occurs in close proximity to Vaccinium occidentale. At elevations above 2135 m (7,000 ft), L. caerulea is reduced to an unbranched "whip", not more than 30 cm (1 ft) high. The tallest specimens, to 1.3 m (4 ft), occur in riparian willow thickets. Circumboreal, from Can. south to CA, NV, WY, MN, and PA.

4. Lonicera tatarica L.

Tatarian Honeysuckle

This shrub has a habitat similar to that of L. utahensis, but it is more coarse and vigorous, up to 3 m (10 ft) tall. It blooms prolifically. Flowers are rose-pink or white with a pink flush.

Tatarian honeysuckle is an often-cultivated, Eurasian species. It is an escapee in Missoula, where it is winter-hardy, and has been distributed, perhaps by birds, to other Montana towns. (Not illustrated).

Group III. This is our only vine honeysuckle.

5. Lonicera ciliosa (Pursh) DC.

Trumpet Honeysuckle

Trumpet honeysuckle is a twining vine that grows to a length of over 8 m (26 ft). The short-petiolate leaves are glaucous beneath, elliptic to egg-shaped, and rounded or abruptly narrowed at the tip. The uppermost pair of leaves on each branch is sessile and fused to surround the stem. Light- to deep-orange flowers are more showy than those of other species.

In our area this vine occurs north and east of Missoula in open to moderately dense forests or shrubfields of the major valleys and montane zone. Southern B.C. to CA, east to W. MT

Flowers are visited by hummingbirds and butterflies.

Sambucus L. Elderberry

Elderberry shrubs have numerous pithy stems and soft, glaucous young twigs. The large leaves are petiolate, divided into leaflets, and have serrate leaflets that come to an abrupt point. The peculiarly scented flowers are small, white or creamy-white, and arranged in large, dense clusters. In our area the berry clusters are blue or purplish-black.

1. Fruits decidedly glaucous; inflorescence flat-topped and extending past main branches...(1) S. cerulea
1. Fruits not glaucous; inflorescence pyramidal or obviously convex and extending considerably beyond the lowest branches.....(2) S. racemosa

1. Sambucus cerulea Raf.

Blue Elderberry

Blue elderberry is a tall shrub, to 4 m (13 ft) in our area. Leaves are composed of 5-9(11) lance-shaped, sharp-pointed, and sharply toothed leaflets. The distinctly flat-topped inflorescence is like that of a member of the carrot family. The powdery bloom covering the dark blue to black berries causes them to appear pale blue.

This is a common riparian species and also occurs upslope in moist openings and open forest of the montane zone. From S. B.C. to W. MT, south to CA, AZ, and NM.

Berries are eaten by humans and various wildlife species, especially bears.

2. Sambucus racemosa L.

Black Elderberry

Black elderberry is similar to S. cerulea in growth habit but is generally smaller. The 5-7 leaflets are distinctly more acuminate than those of S. cerulea. The compound, cone-shaped or pyramidal inflorescence bears glossy, purple-black berries that lack a bloom.

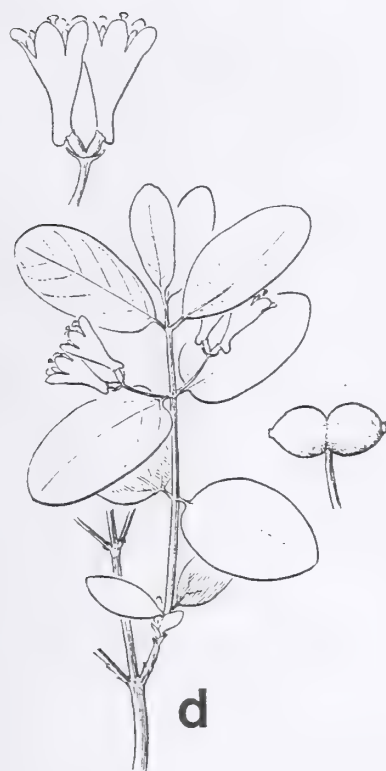
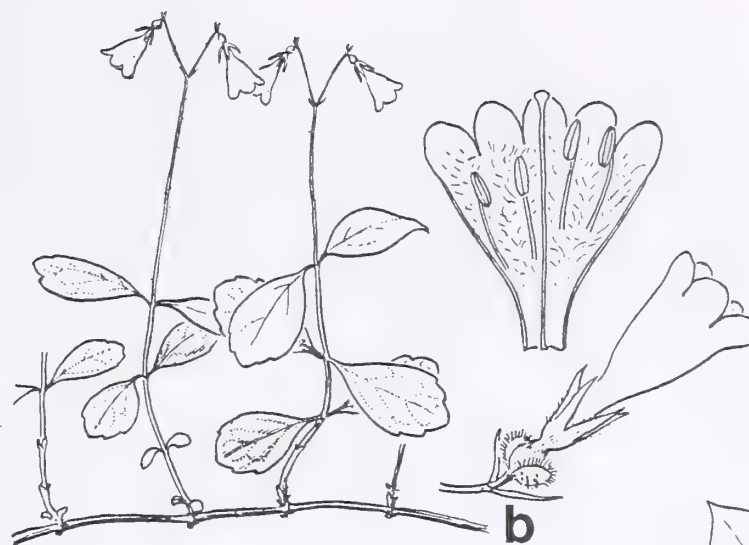
Locally common from the montane to upper subalpine zones, mostly in moist forest openings (e.g., avalanche chutes) or open forest. Our variety is melanocarpa (Gray) McMinn. Circumboreal, south through most of the Rocky Mountains.

Fruit is edible and stronger tasting than that of S. cerulea. Succulent young growth is highly palatable to cattle, deer, elk, bear, and mountain goats. The high palatability of herbage and berry can lead to decimation of local populations.

Symphoricarpos DuRoi Snowberry

Snowberries are erect, densely branched shrubs up to 1.8 m (9 ft) tall. The elliptical to egg-shaped leaves have short petioles and are entire or with a few irregular teeth or lobes. The pink to white flowers are bell-shaped with 5 rounded lobes. The white, berrylike fruit contains 2 nutlets each of which contains a seed.

1. Corolla relatively long and narrow, an elongated bell-shape, longer than wide; individual shrubs not evidently rhizomatous; stems with solid pith.....(3) S. oreophilus
1. Corolla short, broad and short-campanulate, scarcely, if ever, longer than wide; shrubs evidently rhizomatous.....2
2. Style longer than 3 mm, exerted past corolla lobes; stem pith webby, not hollow....(2) S. occidentalis
2. Style <3 mm long, not exerted; older stems hollow, no webby pith.....(1) S. albus



a. *Cleome serrulata* b. *Linnaea borealis* c. *Lonicera involucrata* d. *L. utahensis* e. *L. caerulea*
f. *Lonicera ciliosa*

CARYOPHYLLACEAE

1. Symphoricarpos albus (L.) Blake

Common Snowberry

Common snowberry is a rhizomatous and medium-sized shrub, 1-1.5 m (3-4.5 ft) tall, except in riparian habitats, where it reaches 2 m (6 ft). Leaves are mostly 15-40 mm long, but those of the young, mostly sterile shoots are larger and coarsely and irregularly toothed. The style of common snowberry is 2-3 mm long, not projecting above the corolla lobes. The corolla is densely hairy within, and the lobes are mostly shorter than the tube.

This species is often the most common shrub of valley, foothill, and lower montane zones. It is often associated with Rosa woodsii in both shrub thickets and open to closed canopy forests. From AK east to Que., south to CA, ID, CO, and NB.

2. Symphoricarpos occidentalis Hook.

Western Snowberry

Western snowberry has branched rhizomes and forms dense colonies. Stems, 30-100 cm (12-40 in) tall, are less branched than those of S. albus. The broadly elliptic to egg-shaped leaves, 25-80 mm long, have petioles up to 10 mm long. The lower (and larger) leaves of sterile shoots are often toothed or lobed. The anthers and style extend beyond and are visible between the corolla lobes. The densely hairy (within) corolla has flared lobes that equal or slightly exceed the tube length. The style is long-hairy in the middle.

This species is uncommon to rare in our area but a characteristic component of wooded draws and plains in MT east of the Continental Divide. It has been collected near the Lee Metcalf Wildlife Refuge and reputedly occurs north of Missoula and in Greenough Park. From B.C. east to Man., south to n. WA, UT, NM, MI, and MO.

3. Symphoricarpos oreophyllus Gray

Mountain Snowberry

Though approximately the same size as the previous 2 species, mountain snowberry is distinctly non-rhizomatous (individual shrubs quite recognizable) and more densely branched. Its leaves are elliptic to egg-shaped and slightly smaller, 10-35 mm long. The corolla is evidently longer than wide, and the tube is longer than the lobes. The tube is short-hairy within, below the point where the anther stalks are attached.

Throughout most of our area, mountain snowberry is uncommon, but in southern Ravalli County, it is widespread on dry slopes, often growing associated with Philadelphus lewisii at lower reaches of talus slides. In the Bitterroot and Sapphire ranges, it occurs well into the subalpine zone. From s. B.C. south to MT, CA, NM, and n. Mex., wholly east of the Cascade summits.

Viburnum L. Viburnum

This genus includes shrubs with opposite, lobed or simple leaves. The small 5-parted flowers are borne in a large, umbrella-shaped inflorescence.

1. Leaf blades glabrous or, more frequently, with stiff hairs, especially along main veins..(1) V. opulus
1. Leaf blades (and twigs) densely covered with minute, stellate hairs.....(2) V. lanata

1. Viburnum opulus L.

American High-bush Cranberry

High-bush cranberry is a sturdy shrub, 2-4 m (6-12 ft) tall. The leaves are conspicuously 3-veined and deeply 3-lobed with irregularly toothed or wavy margins. The marginal flowers of the gleaming white inflorescence are sterile and much enlarged (15-25 cm across) compared to the perfect flowers (3-4 mm across). Fruits are bright red, elongated, and have a flattened stone.

This shrub is rare and found along stream banks. In our area it is known from Rattlesnake Canyon, lower Blodgett Creek and along the Bitterroot River near Missoula. Circumboreal, south in North America to WA, ID, WY, SD, IL, and PA. Our variety is americanum Ait.

Fall foliage is a deep purple-red. The acidic fruits are suitable for preserves if taken after the first frost.

2. Viburnum lantana L.

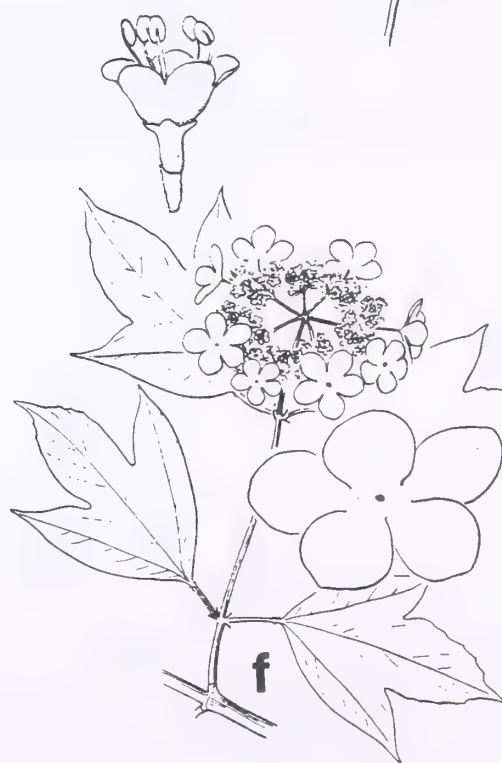
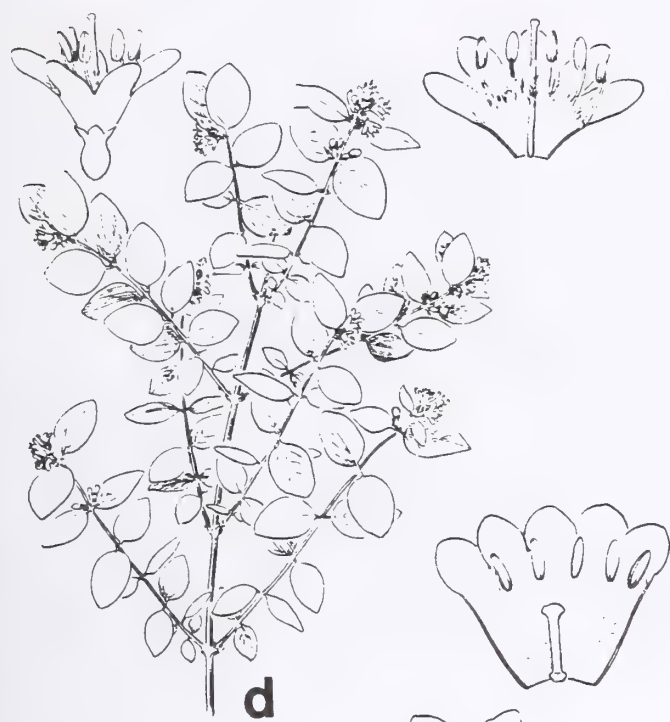
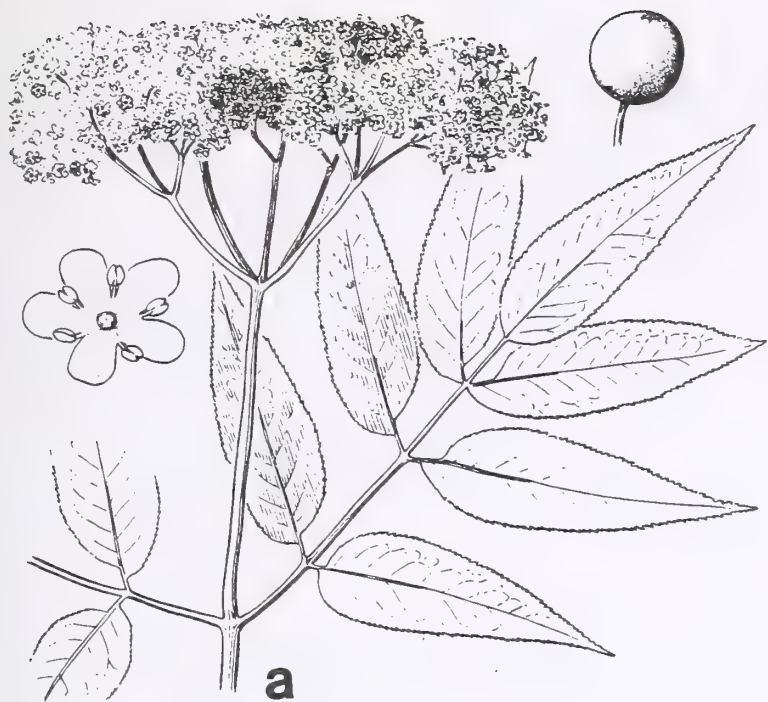
Wayfaring-tree

Wayfaring-tree is a tall shrub or small tree. The young twigs and leaves are densely covered with minute, star-shaped hairs that impart an ashen cast to the foliage. Leaves are toothed and oblong to egg-shaped. The fruits are black and berrylike.

This species is Eurasian and often planted here. It has escaped to establish on islands in the Clark Fork River near the University of Montana. (Not illustrated).

CARYOPHYLLACEAE Pink Family

Members of the Pink Family are annual or perennial herbs with simple, entire leaves that are usually opposite but occasionally alternate or whorled on the stem. Stems are often swollen at the leaf nodes,



a. *Sambucus cerulea* b. *S. racemosa* c. *Symphoricarpos albus* d. *S. occidentalis* e. *S. oreophilus*
f. *Viburnum opulus*

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which may also have leaflike appendages (stipules). The flowers are bisexual or unisexual and radially symmetrical. They are borne in compact or open inflorescences or are solitary in the axils of leaves. The (4)5 sepals are free or united into a tube. The (4)5 petals are separate or lacking and frequently lobed or toothed. The 3-10 stamens often have distinctly colored anthers. The ovary is sessile or stalked. The fruit is a capsule which opens at the top and has few to many seeds.

1. Sepals united to form a tube, free portion less than 1/3 the total length.....2
1. Sepals separate most of their length.....5
2. Styles usually 2 (sometimes 3, inspect several flowers).....3
2. Styles 3-5.....7
3. Calyx 1-3 mm long.....Gypsophila paniculata
3. Calyx greater than 5 mm long.....4
4. Flowers immediately subtended by 1-several pairs of tapering, often united bracts.....Dianthus
4. Flowers not immediately subtended by bracts.....5
5. Blade of petal 5-8 mm long, lacking appendages at the base, calyx angled.....Vaccaria segetalis
5. Blade of petal 10-15 mm long with 2 appendages at the base, calyx tubular.....Saponaria officinalis
6. Styles usually 3, flowers mostly with both styles and stamens.....Silene
6. Styles usually 5, flowers either male or female and on separate plants.....Lychnis alba
7. Leaves with prominent membranous or papery stipules at the nodes where the leaves join the stem.....8
7. Leaves without prominent stipules at the nodes.....9
8. Plant erect, leaves appearing distinctly whorled on the stem.....Spergula arvensis
8. Plants usually prostrate, leaves not appearing whorled.....Spergularia rubra
9. Petals entire or slightly wavy on the margins.....10
9. Petals 2-lobed at the tip or absent.....13
10. Sepals united ca. 1/2 of their length, plants usually greater than 40 cm (16 in) tall.....Gypsophila paniculata
10. Sepals separate at least 2/3 their length, plants often less than 40 cm tall.....11
11. Styles usually 5; plants prostrate or ascending.....Sagina
11. Styles usually 3; plants often erect.....12
12. Plants annual, petals equaling or exceeding the sepals.....Holosteum umbellatum
12. Plants perennial, or, if annual, then petals 1/2-2/3 as long as the sepals.....Arenaria
13. Mature seed capsule more or less egg-shaped, splitting nearly to the base at maturity.....Stellaria
13. Mature seed capsule cylindrical, opening just at the tip by means of reflexed teeth.....Cerastium

Arenaria L. Sandwort

Species in this genus are annual or perennial herbs with opposite leaves that lack stipules and petioles. Clusters of secondary leaves are often borne at the leaf bases. The flowers are usually borne in open to congested, somewhat flat-topped, terminal or axillary inflorescences. The 5 petals are white and mostly entire-margined or occasionally absent. The 5 sepals are separate or united at the base. There are usually 10 stamens and 3(2-5) styles. The fruit is a 1-celled capsule.

1. Leaves lance-shaped to egg-shaped in outline, larger ones at least 3 mm wide.....2
1. Leaves linear, rarely more than 2 mm wide.....4
2. Plants annual from a weak taproot.....(10) A. serpyllifolia
2. Plants perennial from rhizomes and branched rootcrown.....3
3. Sepals pointed at the tip, petals less than 1.5 times as long as the sepals.....(4) A. macrophylla
3. Sepals rounded at the tip, petals ca. 2 times as long as the sepals.....(5) A. lateriflora
4. Plants usually less than 10 cm (4 in) tall, often densely matted, basal leaves mostly less than 10 mm long.....5
4. Plants usually greater than 10 cm tall, loosely branched at the base, basal leaves mostly greater than 10 mm long.....8
5. Sepals rounded at the tip.....6
5. Sepals sharply pointed at the tip.....7

6. Stems erect, petals much greater than the sepals, plants forming cushions.....(6) A. obtusiloba
6. Stems trailing, petals ca. equal to the sepals, plants not forming dense cushions....(7) A. sajanensis
7. Plants forming dense cushions up to 10 cm (4 in) broad, petals equal to or greater than the sepals, stems erect and often reddish below.....(8) A. rubella
7. Plants forming loose mats, petals shorter than the sepals, stems usually curved at the base and not reddish below.....(9) A. nuttallii
8. Inflorescence congested, most flower stalks shorter than the sepals.....(1) A. congesta
8. Inflorescence open, flower stalks much greater than the sepals.....9
9. Inflorescence mostly without glands.....(1) A. congesta
9. Inflorescence glandular.....10
10. Leaves mostly less than 2 cm long, stiff and straight.....(3) A. aculeata
10. Leaves often greater than 2 cm long, relatively soft and often somewhat curved.....(2) A. capillaris

Group I. Species in the first group are tufted perennials with needle- or grass-like leaves. The leafy flowering stems are well-elevated above the mass of basal leaves. They are branched towards the top into dense clusters of flowers.

1. Arenaria congesta Nutt.

Ballhead Sandwort

Ballhead sandwort has slender, erect stems up to 30 cm (12 in) tall from a branched, often woody caudex. The sharp-pointed leaves are glabrous or sparsely hairy on the margins and up to 8 cm (3 in) long. There are 2-4 pairs of stem leaves, and only the basal leaves have secondary leaves in the axils. The flowers are borne in dense to open inflorescences. Sepals have a broad, membranous margin and are blunt to acute at the tip. The petals are longer than the calyx.

This species has three varieties in our area. Var. lithophila Rydb. has obtuse or rounded sepals and a relatively open inflorescence in which the flower stalks are longer than the sepals. It is common in dry, open habitats at all elevations throughout our area. Var. congesta also has obtuse sepals but the inflorescence is densely congested. It is common in dry, open habitats from the valley through the alpine zone. Var. cephaloidea (Rydb.) Maguire has pointed sepals and a congested inflorescence. It is rare in our area and has been collected only in the alpine zone of the southern Bitterroot Range. East of the Cascades, Yuk. to CA., east to MT and CO.

2. Arenaria capillaris Poir.

Mountain Sandwort

This species forms loose mats up to 20 cm (8 in) broad with stems up to 30 cm (1 ft) tall. The basal leaves are erect or ascending and usually 2-4 cm long with fine hairs on the margins and a pointed tip. The foliage generally has a waxy coating and is glabrous below and glandular-hairy in the inflorescence. There are usually 2-4 pairs of stem leaves. There are few to several flowers in an open inflorescence. The sepals are often tinged with purple and have membranous margins and blunt or pointed tips. The petals are up to 2.5 times as long as the sepals. The mature capsule is oval-shaped and longer than the sepals.

In our area mountain sandwort is locally abundant in drier rocky, open habitats in the subalpine to timberline zones, such as the crest of the Selway-Bitterroot Divide. Circumboreal, south to OR and NV and east to Alta. and MT.

Our plants are var. americana (Mag.) Davis. The flowers of this species vary considerably in size. In a mature whitebark pine-alpine larch forest on Ward Mountain, it forms a striking display with the deep blue flowers of Veronica cusickii.

3. Arenaria aculeata Wats.

Prickly Sandwort

Prickly sandwort is similar to A. capillaris, but the basal leaves are shorter, usually 1-2 cm long, and more stiff and pointed. There are generally only 1-2 pairs of stem leaves, up to 5 mm long. The stems are densely glandular-hairy above. The inflorescence is open, and the flower petals are about twice as long as the sepals.

Locally common in dry, open habitats in the subalpine and timberline zones of the Bitterroot Mountains from Mount Jerusalem, west of Sula, south and east to the Continental Divide. Great Basin, OR to CA, east to sw. MT and UT.

Group II. Species in the second group are low-growing perennials with both flowering and sterile stems from rhizomes and branched rootstocks. The stems are curved at the base and usually less than 10 cm (4 in) tall. The leaves increase in size upward and are soft, thin-textured and widely spaced on the stem. The flowers do not greatly surpass the uppermost leaves.

4. Arenaria macrophylla Hook.

Largeleaf Sandwort

This species has narrowly elliptic to lance-shaped leaves, usually less than 5 cm (2 in) long and acute at the tip. The herbage is lightly hairy and rough to the touch. The 2-5 flowers are borne in an



var. lithophila



var. cephaloidea



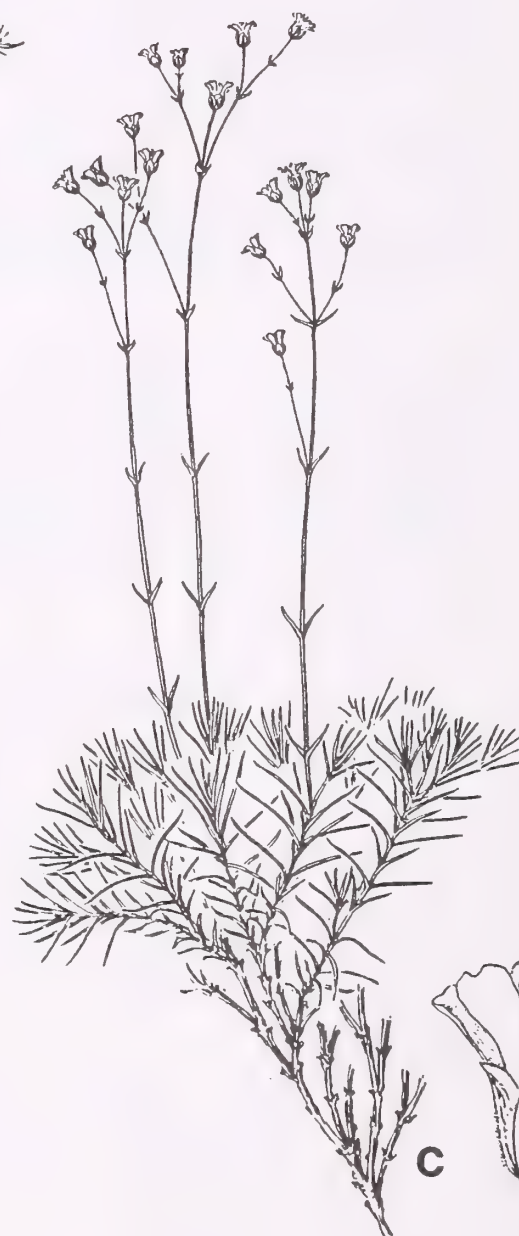
petal

a

var. congesta



b



c



a. *Arenaria congesta* b. *A. capillaris* c. *A. aculeata*

open inflorescence. Sepals are 3-6 mm long and pointed at the tip, and petals are usually about as long as the sepals. The capsule is oval or round.

Largeleaf sandwort is common in moist or, more commonly, dry, often-forested habitats from the valley to the lower subalpine zone throughout our area. B.C. to CA, east to NM and the Atlantic.

5. Arenaria lateriflora L.

Bluntleaf Sandwort

Bluntleaf sandwort has leaves that are widest above the middle and rounded at the tip. The herbage is lightly hairy and often rough to the touch. Flowers are borne in an open inflorescence. The sepals are white-margined and rounded at the tip, and petals are usually twice as long as the sepals. The seed capsule is round.

This plant occurs in mesic habitats, such as streambanks, meadows and margins of moist forests, from the valley to the lower subalpine zone throughout our area. Circumboreal, south on the east side of the Cascades to CA and NM and in the Appalachians to PA.

A. lateriflora and A. macrophylla occasionally intergrade in our area.

Group III. The third group contains dwarf, mat-forming perennial plants with a branched caudex and taproot. The stems are erect to prostrate and less than 10 cm (4 in) tall. The leaves are narrowly linear in outline and usually sharp-pointed. Secondary leaves are present in the leaf axils. Old discolored leaves often persist on the lower stems. The sepals are thickened on the back. These are plants of upper subalpine to alpine zones.

6. Arenaria obtusiloba (Rydb.) Fern.

Alpine Sandwort

Alpine sandwort forms mats up to 40 cm (16 in) broad with flowering stems up to 6 cm (2 in) high. The foliage is variously hairy or glandular below and glandular-hairy above. The erect flowers are solitary or 2-3 per stem. The glandular sepals are usually 4-5 mm long, membranous-margined, rounded at the tip, and often purplish. Petals are up to twice as long as the sepals. The seed capsule is oval to cylindrical.

This species is common in dry, rocky habitats near or above timberline in the Bitterroot Mountains. It is less common in the Sapphire and Rattlesnake ranges. AK to OR, east to Alta. and NM and across Can. to Greenl. and Lab.

7. Arenaria sajanensis Willd.

Arctic Sandwort

[Minuartia biflora (L.) Schinz. & Thell.]

This species is similar to and often intergrades with A. obtusiloba, but it usually forms loose mats, and the flowering stems are often trailing. The foliage is less glandular, and the petals are more-or-less equal to the sepals.

Arctic sandwort occurs in cool, moist habitats in the alpine zone of the Bitterroot Mountains. It has been found in late-melting snow depressions with Chionophila tweedyi and Lewisia pygmaea and in moist rock crevices with Saxifraga debilis. Circumpolar, south in the Rocky Mountains to CO.

Included in A. obtusiloba by Hitchcock and Cronquist (1973, Flora of the Pacific Northwest). (Not illustrated).

8. Arenaria rubella (Wahlenb.) J.E. Smith

Reddish Sandwort

Reddish sandwort is densely tufted, forming cushions up to 10 cm (4 in) broad. The stems are erect, up to 10 cm (4 in) tall, and often reddish at the base. The stems and usually the leaves are glandular-hairy. Sepals are 3-4 mm long, membranous-margined, and sharp-pointed. The petals are about the same length as the sepals.

In our area, known only from rocky or sandy alpine sites in the Bitterroot Mountains. Circumpolar, south in the w. U.S. to CA and NM.

9. Arenaria nuttallii Pax

Nuttall's Sandwort

This species is loosely matted; the brittle stems are often trailing and up to 15 cm (6 in) long. The foliage is glandular-hairy. The open inflorescences are few to several flowered. The flower stalks are brittle and break easily at the joints. Sepals are 4-6 mm long and pointed or sharp-pointed, and the petals are shorter than the sepals.

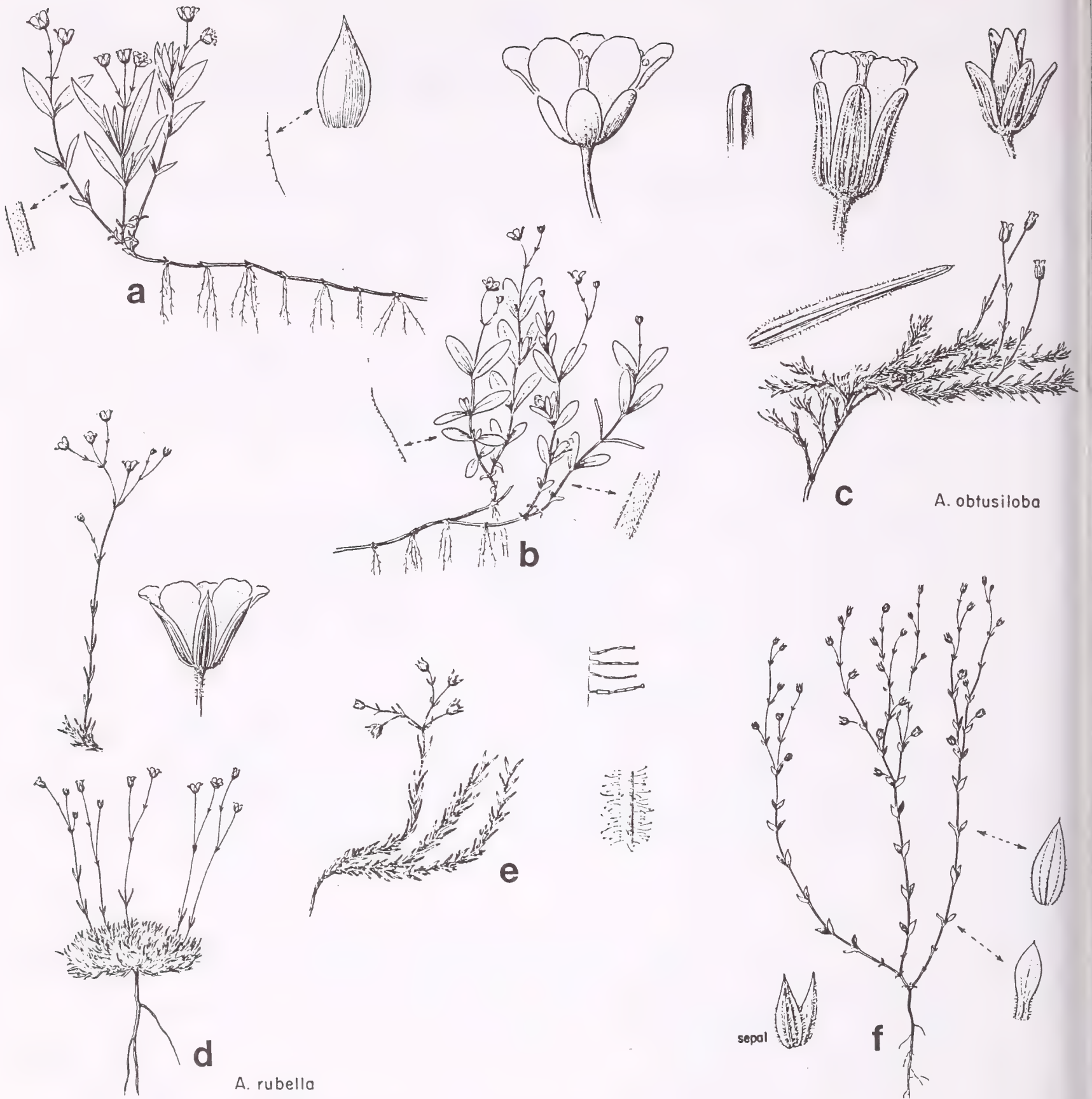
In our area Nuttall's sandwort is known only from an open slope in the upper subalpine zone of the Sapphire Range. B.C. to CA, east to Alta., WY, and UT. Our plants are var. nuttallii.

Group IV. The last group contains an annual species of disturbed habitats.

10. Arenaria serpyllifolia L.

Thyme-leaved Sandwort

Thyme-leaved sandwort is a slender annual with erect stems, 5-30 cm (2-12 in) tall, that are often branched at the base. The leaves are egg-shaped, pointed at the tip, and 3-7 mm long. The petioles are short or lacking. The herbage is hairy and rough to the touch, becoming glandular above. Flowers are



a. *Arenaria macrophylla* b. *A. lateriflora* c. *A. obtusiloba* d. *A. rubella* e. *A. nuttallii*
 f. *Arenaria serpyllifolia*

borne in relatively narrow, leafy-bracted inflorescences. Sepals are narrow and about 3 mm long with pointed tips. The petals are shorter than the sepals.

This species is frequent in sandy soils and dry, disturbed areas in the valley zone and along roads in the montane zone throughout our area. Introduced from Eurasia into most of temperate North America.

Cerastium L. Chickweed

Species in this genus are annual or perennial herbs with entire-margined leaves opposite on the stem. The herbage is usually hairy and often sticky. The few to several (rarely solitary) flowers are borne in an open inflorescence. There are 5 sepals and 5 petals. The petals are white and deeply lobed at the tip. The seed capsule is cylindrical and often slightly curved at maturity.

1. Petals subequal to the sepals, plants of disturbed habitats, annual to short-lived perennials.....2
1. Petals usually 1.5-3 times as long as the sepals, native perennials, mainly of undisturbed habitats..4
2. Flowers in relatively dense clusters in an open inflorescence, flower stalks shorter than the sepals.....(2) C. viscosum
2. Flowers not in clusters, flower stalks longer than the sepals.....3
3. Plants annual, not matted or rooting at the nodes.....(1) C. nutans
3. Plants biennial or perennial, matted and rooting at the nodes.....(3) C. vulgatum
4. Bracts of the inflorescence without papery margins, lower leaves without secondary leaves and shoots in the axils, plants from timberline and above.....(5) C. beeringianum
4. Bracts of the inflorescence with papery margins, lower leaves with secondary leaves and stems in the axils, usually below timberline.....(4) C. arvense

Group I. This first group contains annual, biennial, or short-lived perennial species. They are mostly introduced weeds, occurring in disturbed ground such as agricultural fields, lawns and gardens in the valley and montane zones.

1. Cerastium nutans Raf.

Nodding Chickweed

Nodding chickweed is an annual with weak, ascending stems, simple or branched at the base and up to 30 cm (12 in) long. The leaves are lance- to spoon-shaped and up to 3 cm long. Flowers are borne on nodding stalks. The sepals are narrowly lance-shaped, and the petals are up to 2 times as long as the sepals (occasionally shorter or lacking).

This species is common in the valley zone, less common in the montane zone. Widespread in temperate North America, common in e. U.S. and perhaps introduced in our area.

2. Cerastium viscosum L.

Sticky Chickweed

This annual plant has 1-several lax or ascending stems up to 30 cm (12 in) long. The lower leaves are oblong to spoon-shaped, 8-15 mm long, and gradually narrowed to the petiole. The upper leaves are larger and without a petiole. The foliage is densely hairy and sticky-glandular. Flowers are borne in tight clusters in an open inflorescence. The petals are 4-5 mm long and slightly shorter than the sepals.

Sticky chickweed is common in the valley zone, less abundant in the montane zone. Introduced from Eurasia, widespread in North America.

3. Cerastium vulgatum L. [C. fontanum Baumg.]

Mouse-ear Chickweed

This species is a biennial or short-lived perennial with lax or ascending stems, mostly 20-40 cm (8-16 in) long and often rooting at the nodes. The lower leaves are oblong to broadly lance-shaped and 10-25 mm long. The upper leaves are larger. The herbage is densely glandular and hairy throughout. The sepals are 4-7 mm long and have whitish, papery margins. The petals are shorter than the sepals.

Mouse-ear chickweed is common in the valley zone, less so in the montane zone. Introduced from Eurasia, widespread in temperate and boreal North America.

This plant is a troublesome weed in our lawns and gardens.

Group II. This group contains two native perennial species.

4. Cerastium arvense L.

Field Chickweed

Field chickweed is tufted and matted with trailing or ascending stems, up to 30 cm (12 in) tall, that are branched above. The lower leaves are egg-shaped in outline with secondary leaves or stems in the axils. The upper leaves are more linear or lance-shaped and up to 3 cm long. The herbage is glabrous to densely hairy and glandular. Flowers are borne in a terminal, open inflorescence. The bracts below the

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flower stalks have whitish, papery margins. The sepals are oblong lance-shaped and 4-6 mm long. The petals are up to 3 times as long as the sepals.

The plant is common in dry, open habitats in the valley and montane zones. It is less common in subalpine areas. Circumboreal, south to CA, NM, and GA.

This species has many ecotypes. In some of the state's limestone mountain ranges, it is common above timberline.

5. Cerastium beeringianum Cham. & Schlecht.

Alpine Chickweed

This is a mat-forming plant with trailing stems, mostly less than 10 cm (4 in) long and without secondary leaves and shoots in the leaf axils. Leaves are lance-shaped to spoon-shaped and mostly 10-15 mm long. The herbage is glandular and densely short-hairy. The terminal inflorescence has 1-few flowers. The bracts below the flowers do not have papery margins. Sepals are 4-6 mm long and often tinged with purple. The petals are up to 2 times as long as the sepals.

Alpine chickweed occurs in moist, open habitats in the alpine zone. It has been collected on Ward Mountain southwest of Hamilton and Sugarloaf Peak southwest of Darby. B.C. to CA, east to Alta., CO, and AZ.

The plant is similar to Cerastium arvense, but can be distinguished by its lower and more compact growth form and by the lack of papery margins on the flower bracts.

Dianthus L. Pink

Species in this genus are annual to perennial herbs with stems that are simple or branched above. Flowers are subtended by 1-several pairs of enfolding bracts. The sepals are united into a tube. Petals are longer than the sepals and consist of a wide, usually lobed or wavy-margined blade and a long, narrow lower portion (claw).

The genus is native to Eurasia. The species in our area are introduced.

- 1. Stem and bracts of the inflorescence hairy.....(1) D. armeria
- 1. Inflorescence glabrous.....(2) D. barbatus

1. Dianthus armeria L.

Deptford Pink

Deptford pink is an annual or, more commonly, a biennial with 1-several erect stems up to 40 cm (16 in) tall. The linear leaves are held nearly erect and are reduced upwards. The herbage is glabrous or sparsely hairy above. The pink flowers are borne in a congested inflorescence and are subtended by long, slender, sharp-pointed bracts. Petals are 20-25 mm long.

This species occurs in open, disturbed habitats in the valley and montane zones. It is common along Hwy. 12, west of Lolo and around former homesteads in the Rattlesnake Valley. Introduced throughout the Pacific Northwest.

2. Dianthus barbatus L.

Sweet William

A perennial with numerous stems that are n curved at the base and up to 60 cm (2 ft) tall. The basal leaves are oblong lance-shaped and up to 10 cm (4 in) long. The stem leaves are little reduced upwards. Stem nodes are prominent, and the herbage is glabrous. The numerous flowers are white to dark red and densely clustered in the terminal inflorescence. Petals are 20-25 mm long.

Sweet William is a familiar garden plant that occasionally escapes on roadsides and other disturbed areas. It has been collected near Missoula and Hamilton.

Gypsophila L. Baby's-breath

Gypsophila paniculata L.

Baby's-breath

Baby's-breath is a perennial herb with much-branched stems, usually 40-80 cm (16-32 in) tall. The leaves are linear to lance-shaped, without petioles, and usually 2-5 cm (1-2 in) long. The herbage is glabrous and more-or-less covered with a thin, waxy coating. Flowers are borne in an open, freely-branched inflorescence the shape of a hemisphere. The sepals have papery margins and are about 2 mm long. Petals are white and longer than the sepals. The capsule is egg-shaped and exceeds the calyx.

This species is locally common on roadsides and in abandoned fields in the Missoula and Hamilton area. Introduced from the Mediterranean region into much of the Pacific Northwest.

Baby's-breath is frequently used by commercial florists in dried flower arrangements.

Holosteum L. Jagged Chickweed

Holosteum umbellatum L.

Jagged Chickweed

This annual has simple or basally branched stems typically less than 15 cm (8 in) tall and usually much smaller. The basal leaves are oblong lance-shaped and 1-2 cm long. The 2-3 pairs of stem leaves are



a. *Cerastium nutans* b. *C. viscosum* c. *C. vulgatum* d. *C. arvense* e. *C. beeringianum*
 f. *Gypsophila paniculata* g. *Dianthus armeria* h. *D. barbatus*

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wider. The foliage is soft hairy below and glandular hairy above. Flowers are borne in a flat-topped inflorescence at the top of the stem. Sepals are separate and about 3 mm long. The white petals are jagged at the tips and slightly longer than the sepals. The seed capsule is nearly twice as long as the sepals.

Jagged chickweed is common in moist or vernal moist, open habitats in the valley and montane zones. In years with a wet spring, it appears in great masses in overgrazed pastures. Introduced from Eurasia and established throughout much of North America.

Lychnis L. Campion

The genus contains biennial or perennial herbs with 1-few stems and opposite, entire-margined leaves. Flowers are borne in an open inflorescence. The sepals are united into a tube that is often inflated, especially in fruit. Petals are longer than the sepals and are usually lobed or notched at the tip. There are often appendages on the petal where the broad upper portion (blade) joins the narrower lower segment (claw). There are usually 5 styles. The seed capsule usually has a short stalk.

Species of Lychnis are similar to members of the genus Silene but can be distinguished by having 5 styles rather than 3.

1. Flowers white, plant coarsely hairy but not white-hairy.....(1) L. alba
1. Flowers red, plant densely white-hairy.....(2) L. coronaria

1. Lychnis alba Mill.

White Campion

White campion is a coarse perennial with 1-several stems up to 1 m (3 ft) tall from a strong root system surmounted by a branched rootcrown. The leaves are oblong lance-shaped to elliptic and up to 10 cm (4 in) long. The lower leaves are petiolate; the upper ones are without petioles and are gradually reduced. The herbage is coarsely hairy below and glandular above. The two sexes are borne on different plants (dioecious). The petals are white and 7-10 mm long with a deeply lobed blade.

This introduced species is common in moist, open, disturbed habitats in the valley zone, less common in the montane zone. It is most abundant in gardens, lawns, and fields. Native to Europe, widely distributed in North America.

The attractive and more-or-less fragrant flowers open in the evening and close the next day before noon.

2. Lychnis coronaria (L.) Desr.

Rose Campion

Rose campion is a perennial with several unbranched stems, 40-100 cm (16-39 in) tall, from a branched rootcrown. The leaves are lance-shaped and 5-10 cm (2-4 in) long. They lack petioles and become smaller and spaced further apart upwards on the stem. The herbage is covered with dense, whitish hair. The calyx is enlarged in fruit, and the lobes are twisted. The petals are deep red with a heart-shaped blade.

This species is a common garden flower. It has escaped and persists in old fields and other disturbed areas near Hamilton and Missoula. Native of Europe, occasionally escaping in the Pacific Northwest.

Sagina L. Pearlwort

Members of this genus are low growing, glabrous, tufted or matted biennials or perennials. The thin stems are prostrate to ascending and 5-15 cm (2-6 in) long. The leaves are linear and united at the base opposite each other on the stem. The small flowers are borne on the end of long stalks at the end of the stems or in the axils of leaves. The 4-5 petals are shorter than the sepals or lacking.

1. Rosette of numerous basal leaves present, leaf axils without secondary leaves, montane and above.....(1) S. saginoides
1. Basal rosette absent, secondary leaves usually present in the leaf axils, valley or occasionally montane zones.....(2) S. procumbens

1. Sagina saginoides (L.) Britt.

Alpine Pearlwort

This species has many ascending stems, usually less than 6 cm (2 in) long. The numerous basal leaves are 5-15 mm long. Stem leaves are generally without secondary leaves in the axils. The 1-2 flowers per stem usually have petals. The capsule is 1-2 times as long as the sepals.

Widely scattered in moist, open habitats such as streambanks or trails in the montane and subalpine zones. Circumpolar, south to CA, Mex., MI, and Que.

2. Sagina procumbens L.

Prostrate Pearlwort

This plant has prostrate stems up to 15 cm (6 in) long that often root at the nodes. There is no apparent basal rosette of leaves, and the stem leaves often have clusters of secondary leaves in the axils.

There are 2-several flowers per stem. The petals are usually lacking (in our area). The seed capsule is 1-2 times as long as the sepals.

This introduced species occurs in moist, open habitats in the valley and montane zones. It has been found in gardens as well as along small streams. Native to Eurasia, introduced in the Pacific Northwest and ne. U.S.

Prostrate pearlwort seems to have increased during the recent past.

Saponaria L. Soapwort

Saponaria officinalis L.

Bouncing Bet

Bouncing bet is a rhizomatous perennial that forms large clumps of unbranched stems up to 90 cm (36 in) tall. The leaves are lance-shaped, pointed at the tip and tapered at the base. The foliage is nearly glabrous. Flowers are borne in a terminal, congested inflorescence. The calyx tube is nearly cylindrical and 15-20 mm long. The fragrant flowers have 5 or 10 white or pale pink petals with spreading and wavy-margined blades. There are 2 linear appendages at the base of the blade. Styles are 2 or occasionally 3.

The introduced species is a common garden plant. It is locally common in moist, open, disturbed habitats in the valley and has been collected near Missoula and Victor. Native to Europe, established in much of North America.

Scleranthus L. Knawel

Scleranthus annuus L.

Annual Knawel

This species is a low, spreading annual with prostrate or ascending stems up to 10 cm (4 in) long. The linear leaves are hard-pointed and united opposite each other on the stem. The herbage is glabrous to densely short-hairy. The minute flowers are borne, without stalks, in the axils of the upper leaves. The greenish calyx is bell-shaped at the base with 5 lobes above. Petals are lacking. There are 2 styles.

Annual knawel has just recently been introduced into our area. It occurs in open, disturbed ground in the valley zone and has been collected at three places in the Missoula area. Native to Europe, common in e. U.S. and occasional in the West.

Silene L. Catchfly, Campion

The species in this genus are annual, biennial, or perennial herbs with opposite, entire-margined leaves. Flowers are solitary or several in an open inflorescence. The sepals are united into an often inflated, 5-lobed tube with numerous nerves. The 5 petals are usually lobed at the tip and have appendages at the point where the broader upper portion (blade) joins the narrower lower segment (claw). There are usually 10 stamens and 3(4) styles. The capsule has 6 teeth at the top when it opens to release the seeds.

1. Plants low, densely tufted, forming mats in alpine habitats, stems mostly less than 6 cm (2 in) long.....(10) S. acaulis
1. Plants not forming dense mats, usually occurring at timberline or below, stems more than 6 cm long...2
2. Calyx glabrous.....3
2. Calyx hairy and/or glandular.....4
3. Plants annual, calyx mostly less than 10 mm long.....(2) S. antirrhina
3. Plants perennial, calyx usually greater than 10 mm long.....(1) S. cucubalus
4. Plants annual, weedy species of disturbed habitats.....5
4. Plants native perennials.....7
5. Calyx with 25-30 nerves.....(3) S. conoidea
5. Calyx with 10 nerves.....6
6. Calyx narrowly tubular, mostly less than 15 mm long, flowers, short-stalked, borne on one side of the inflorescence branches.....(5) S. dichotoma
6. Calyx broadly tubular, greatly enlarged in fruit, usually greater than 15 mm long, flowers in a more open inflorescence.....(4) S. noctiflora
7. Calyx less than 10 mm long.....(9) S. menziesii
7. Calyx usually greater than 10 mm long.....9
8. Tip of petals divided into 2 lobes.....(6) S. douglasii
8. Tip of petals divided into 4 or 6 lobes.....9



a. *Holosteum umbellatum* b. *Lychnis alba* c. *L. coronaria* d. *Sagina procumbens* e. *S. saginoides*
 f. *Saponaria officinalis* g. *Scleranthus annuus*

9. Petals with 2 appendages on the inside below the lobes.....(7) S. parryi
 9. Petals with 4 appendages.....(8) S. oregana

Group I. The first group contains species of medium height, mostly introduced from Europe and occurring in disturbed habitats in the valleys and foothills.

1. Silene cucubalus Wibel
 [S. vulgaris (Moench) Garcke]

Bladder Campion

Bladder campion is a perennial with stems that are curved upward at the base and are 20-50 cm (8-20 in) tall. The leaves are lance-shaped and 3-8 cm (1-3 in) long with the lower ones united opposite each other on the stem. Herbage is glabrous and covered with a thin waxy coating. The calyx is bell-shaped during bloom, but becomes inflated, globose and prominently net-veined in fruit. The petal blades are 4-6 mm long and deeply 2-lobed, and the appendages are lacking.

This plant is locally common on roadsides and gravelly riverbanks in the valley zone. Introduced from Europe and widely distributed in North America.

2. Silene antirrhina L.

Sleepy Catchfly

This species is an annual with mostly branched stems up to 60 cm (2 ft) tall. There are sticky dark bands on the upper stem between the nodes. Basal leaves are lance-shaped to spoon-shaped and 3-6 cm (1-2 in) long. The stem leaves are narrower. The plant is glabrous above and short-hairy below. Several to many flowers are borne on slender stalks in the inflorescence. The calyx is glabrous, 4-10 mm long, 10-nerved and slightly contracted at the top. The short calyx lobes are often purplish. Petals are white or pink and about the same length as the calyx or lacking.

Sleepy catchfly is uncommon in dry, open habitats in the valley zone. In our area it is known only from the foothills of the Sapphire Range, east of Corvallis. Throughout temperate North America.

3. Silene conoidea L.

Conoid Catchfly

This species is an annual with simple or branched stems up to 80 cm (32 in) tall. The lower part of the stem has downward-pointing hairs, while the upper portion is glandular. The basal leaves are lance-shaped and 3-13 cm (1-5 in) long. Stem leaves are narrower and gradually reduced upward. The calyx is 2-3 cm long with 25-30 nerves. It is tubular in flower but becomes swollen in fruit. The petals are white to purplish, the blade 8-12 mm long, rounded, and wavy- or entire-margined.

This plant has been collected once in dry grasslands on the slopes of the Sapphire Range. Introduced from Eurasia, widespread but uncommon in North America.

4. Silene noctiflora L.

Night-flowering Silene

This coarse annual has 1-few simple or branched stems up to 60 cm (2 ft) tall. The leaves are broadly lance-shaped and petiolate below, narrower and without petioles above. The herbage is long-hairy and sticky glandular throughout. Flowers have short stalks in a relatively open inflorescence. The 10-nerved calyx is tubular and about 15 mm long in flower, inflated and up to 30 mm in fruit. The white to pinkish petals are lobed and have a pair of appendages at the base of the blade.

Night-flowering silene was collected once near Hamilton. Introduced from Europe, widespread in North America.

5. Silene dichotoma Ehrh.

Forked Catchfly

Forked catchfly is a coarse annual with erect, branching stems up to 80 cm (32 in) tall. The leaves are linear to lance-shaped. The lower are petiolate, while those above are without petioles. The foliage is densely hairy throughout. Flowers are sessile or on short stalks in narrow 1-sided branches of the inflorescence. The 10-nerved calyx is 10-15 mm long, greatly inflated in fruit. The petals are white or tinged with red and have small appendages. They are deeply forked, the 2 lobes slightly wavy-margined at the tip.

This species was collected once near Missoula. Native to Europe, widespread in North America.

Group II. The second group contains native, perennial plants of medium height, usually found in the montane zone or above.

6. Silene douglasii Hook.

Douglas' Catchfly

This species has unbranched stems, up to 30 cm (12 in) tall, that are curved upward at the base. The leaves are lance-shaped, petiolate below, and without petioles above. The basal leaves and those of sterile shoots are numerous. The herbage is finely hairy and sparsely glandular above. The 1-3 flowers are subtended by linear bracts and borne at the end of the stems. The calyx is tubular, 12-15 mm long, becoming inflated and bell-shaped in fruit. Petals are white, sometimes tinged with green or pink. They are shallowly 2-lobed at the tip with two lance-shaped appendages.

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Douglas' catchfly is common in drier, open habitats from the montane zone to timberline in the northern Bitterroot Mountains, especially on St. Joseph and Sweeney peaks west of Stevensville. B.C. to CA, east to MT and UT.

Our plants are var. douglasii. Plants occurring near timberline are considerably dwarfed. In the Bitterroot Mountains, south of Lost Horse Creek, this species is replaced by S. parryi.

7. Silene parryi (Wats.) Hitchc. & Mag.

Parry's Catchfly

Parry's catchfly is a perennial with few to many unbranched stems, 10-30 cm (4-12 in) tall, from a branched caudex. The numerous basal leaves are linear to lance-shaped, long-petioled, and 3-8 cm (1-3 in) long. The 2-3 pairs of stem leaves are narrower and gradually reduced upward. The foliage is densely short-hairy and glandular. The 1-several flowers are borne in a narrow, terminal inflorescence. The tubular calyx is 12-16 mm long with 10 prominent purple or dark green nerves. Petals are white, often tinged with green or purple. They are 4-lobed with two appendages at the base of the blade.

This species is common in dry meadows, warm slopes, and rockslides in the subalpine to alpine zones. It occurs near the Continental Divide and in the Bitterroot Mountains from Darby south. B.C. and WA, east to MT and WY.

8. Silene oregana Wats.

Oregon catchfly

Oregon catchfly is a taprooted perennial with 1-few simple stems, 30-50 cm (12-20 in) tall, from a branched rootstock. The basal leaves are lance-shaped to spoon-shaped, 4-8 cm (2-3 in) long with long petioles. The stem leaves are narrower with shorter petioles. Herbage is short-hairy and sticky-glandular above. Few to several flowers are borne in a narrow, compact inflorescence. The tubular calyx is 10-15 mm long, with 10 purplish nerves, and a constricted base. Petals are white with a pinkish tinge. The blade is deeply 4- or 6-lobed and has four appendages just below the lobes.

The plant has been collected in open ponderosa pine woodland on Mount Jumbo just north of Missoula. WA to CA, east to MT, WY and NV.

Group III. The third group consists of two low-growing, native perennial species, very different in appearance from the above species.

9. Silene menziesii Hook.

Menzies' Catchfly

This species is a low-growing, often matted plant with numerous lax or ascending stems, usually up to 20 cm (8 in) long, from slender rootstocks. The leaves are lance- to egg-shaped, 2-6 cm long, acute at the tip, and tapered to the base. Flowers are borne on slender stalks from the upper leaf axils or terminating the stems. The calyx is tubular to bell-shaped, obscurely nerved, and 5-8 mm long. The petals are white, and the blade is deeply cleft with 2 small appendages at the base of the blade.

Menzies' catchfly is common in moist, partially shaded woodland habitats in the valley to lower subalpine zones. B.C. to CA, east to Alta. and NM.

This plant is sometimes confused with Arenaria macrophylla but is easily distinguished by its tubular, united calyx.

10. Silene acaulis L.

Moss Campion

Moss campion is a densely tufted, mat-forming cushion plant usually less than 6 cm (2 in) tall. The crowded, linear leaves are 4-10 mm long and without petioles. The old leaf bases remain on the stem for many years. Flowers are solitary at the end of the short stems. The calyx is oblong, 3-10 mm long, and obscurely 10-nerved. Petals are pink to purple with entire to lobed tips.

Uncommon in rocky, open, exposed habitats above timberline in the Bitterroot Mountains. It is rare in the northern part of the range and infrequent south of Lost Horse Creek. It is locally common only above Chaffin Lakes Basin, southwest of Darby. Our plants are var. exscapa (Allioni) DC. Circumpolar, south to OR, NM, and NH.

Spergula L. Spurry

Spergula arvensis L.

Spurry

Plants are annuals with slender, erect to ascending stems up to 40 cm (16 in) tall. The linear and slightly succulent leaves are 1-4 cm long and clustered at the nodes in two opposing groups. The herbage is sparsely hairy and often sticky-glandular. The inconspicuous flowers are borne on long stalks in an open, terminal inflorescence. The 5 sepals are 2-4 mm long and separate to the base. The white petals are entire and equal to or shorter than the sepals.

This introduced species occurs in disturbed soil of gardens and fields. It has been collected around old homesteads in the Bitterroot Valley. Native to Europe, widely introduced in North America.



a. *Silene cucubalus* b. *S. antirrhina* c. *S. conoidea* d. *S. noctiflora*



a. *Silene dichotoma* b. *S. douglasii* c. *S. parryi* d. *S. oregana* e. *S. acaulis* f. *S. menziesii*

Spergularia (Pers.) J.& central Presl. Sand SpurrySpergularia rubra (L.) J.& central Presl.

Red Sand Spurry

Red sand spurry is a small, freely-branched annual with prostrate stems up to 30 cm (12 in) long. The linear to filiform leaves are usually 5-15 mm long and clustered at the papery, white-bracted nodes. The foliage is hairy and glandular. The flowers are borne in open, terminal, leafy-bracted inflorescences. The hairy, glandular sepals are 4-5 mm long. The purplish-red petals are shorter than the sepals and open only in direct sunlight.

This plant is common in dry, open disturbed habitats in the valley to the lower subalpine zone. It can be found up to 1980 m (6,500 ft) along logging roads. Native of Europe, widely introduced in North America.

Stellaria L. Starwort, Chickweed

Our species are mostly low, annual or perennial herbs with flowers in open, bracteate inflorescences in the leaf axils or at the ends of the stems. The 5 sepals are separate to the base. The petals are white and deeply lobed or lacking. There are 3 styles, and the seed capsule is egg-shaped to cylindrical.

- | | | | |
|----|---|-----|----------------------|
| 1. | Stems, petioles and flower stalks with hair in longitudinal lines..... | (1) | <u>S. media</u> |
| 1. | Herbage glabrous or with hair more evenly distributed..... | 2 | |
| 2. | Slender, erect, annual plants, stem leafy only on the lower 1/2..... | (3) | <u>S. nitens</u> |
| 2. | Plants perennial, usually leafy throughout..... | 3 | |
| 3. | Stems pubescent, at least above..... | (8) | <u>S. simcoeii</u> |
| 3. | Stems glabrous..... | 4 | |
| 4. | Flowers solitary in leaf axils..... | 5 | |
| 4. | Flowers in many-flowered inflorescences..... | 7 | |
| 5. | Leaves linear to narrowly lanceolate..... | (6) | <u>S. longipes</u> |
| 5. | Leaves broadly lanceolate to egg-shaped..... | 6 | |
| 6. | Leaves usually glabrous, wavy-margined..... | (5) | <u>S. crispa</u> |
| 6. | Leaves with hair on the lower margin..... | (7) | <u>S. obtusa</u> |
| 7. | Petals shorter than the sepals, bracts of the inflorescence leafy..... | (4) | <u>S. calycantha</u> |
| 7. | Petals longer than the sepals, bracts of inflorescence membranous and papery..... | 8 | |
| 8. | Plants occurring at timberline or above..... | (6) | <u>S. longipes</u> |
| 8. | Plants of montane zone or below..... | (2) | <u>S. longifolia</u> |

Group I. This group contains species that are most common in the valleys and foothills.

1. Stellaria media (L.) Cyrill.

Common Chickweed

Common chickweed is a low annual with diffusely branched, trailing stems that root at the nodes and are up to 50 cm (20 in) long. The leaves are egg-shaped and usually 10-25 mm long, the lower ones petiolate, the upper without petioles. The stems and petioles are short-hairy in longitudinal lines. Flowers are borne on slender stalks in leafy bracted inflorescences from the leaf axils and the ends of the stems. Sepals are about 5 mm long, densely hairy, and glandular. Petals are deeply divided into narrow lobes shorter than the sepals. The capsule is egg-shaped.

Common in moist, partially shaded disturbed habitats such as lawns and gardens. Native to Eurasia, introduced throughout much of North America.

2. Stellaria longifolia Muhl.

Long-leaved Starwort

This species is a perennial with long, 4-angled, ascending to erect stems up to 40 cm (16 in) long. The linear to narrowly lance-shaped leaves are 1-4 cm long and glabrous or with hairs on the margins. Flowers are borne on long, spreading or reflexed stalks subtended by papery bracts. The lance-shaped sepals are 3-4 mm long. Both the petals and the seed capsules are longer than the sepals.

Long-leaved starwort usually occurs in moist meadows from the valleys to the lower subalpine zone. Circumboreal, south to CA, NM, and SC.

3. Stellaria nitens Nutt.

Shining Chickweed

An annual species with slender, erect stems, 5-20 cm (2-8 in) tall, that are simple or branched at the base. The egg-shaped, basal leaves are petiolate with a blade 3-8 mm long. The stem leaves are narrowly lance-shaped and without petioles. Herbage is glabrous to hairy. Flowers are in terminal bracted

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inflorescences. The lance-shaped sepals are white-margined, 3-nerved, and 3-4 mm long. The petals are much shorter than the sepals or lacking. The oblong seed capsule is about as long as the sepals.

Shining chickweed is uncommon in open, disturbed, gravelly or grassy habitats in the valleys. It has been collected south of Hamilton and on Mount Sentinel east of Missoula. B.C. to Baja Cal., east to MT, ID and UT.

GROUP II. The second group is composed of native perennial species found in the mountains, never in the valleys.

4. Stellaria calycantha (Ledeb.) Bong.

Northern Starwort

Plants have several prostrate to erect stems, usually 10-30 cm (5-12 in) long, from slender rootstocks. The lance-shaped to elliptic leaves are 1-5 cm long. The foliage is glabrous with a few hairs on the leaf margins. Flowers are borne on long, slender pedicels (often reflexed at maturity) in leafy-bracteate inflorescences. The sepals are 2-5 mm long and white-margined. Petals are shorter than the sepals or lacking.

Northern starwort is common in moist, open or partially shaded habitats in the subalpine and timberline zones. Our plants are var. bongardiana Fern. Circumpolar, south to CA, WY, MI, and NY.

5. Stellaria crispa Cham. & Schlecht.

Crisped Starwort

This is a low plant with prostrate to ascending stems, up to 15 cm (6 in) long, from creeping rootstocks. The thin, egg-shaped leaves have short petioles (or lacking) and blades that are 10-20 mm long with wavy margins. The foliage is glabrous or sparsely hairy. Flowers are on slender stalks in the leaf axils or in a terminal, leafy inflorescence. The white-margined sepals are 2-4 mm long and prominently 3-nerved. Petals are minute or lacking. The egg-shaped capsule is much longer than the sepals at maturity.

Common in moist, open or partially shaded habitats in the montane to timberline zones. AK to CA, east to Alta. and WY.

6. Stellaria longipes Goldie

Longstalk Starwort

[S. monantha Hulten]

Longstalk starwort has several, 4-angled, erect or ascending, simple or branched stems, 5-20 cm (2-8 in) long, from branching rootstocks. The narrowly lance-shaped leaves are 1-3 cm long and without petioles. Foliage is glabrous except for hairs often on the lower leaf margins. The 1-many flowers are borne on long, straight stalks in an open inflorescence or in the upper leaf axils. The white-margined sepals are about 4 mm long and evidently 3-nerved. The deeply 2-lobed petals are longer than the sepals.

This species occurs in moist, open soil in the upper subalpine to alpine zones. It is rare in our area. Circumboreal, south to CA, NM, MN, and NY.

Two varieties occur in our area. Var. longipes is usually greater than 15 cm (6 in) tall with many flowers in an open inflorescence. Var. altocaulis (Hulten) Hitchc. is usually less than 15 cm tall with 1-3 flowers from the upper leaf axils.

7. Stellaria obtusa Engelm.

Bluntsepaled Chickweed

These are low, matted plants with numerous, prostrate stems 3-10 cm (1-4 in) long. The egg-shaped leaves are 5-10 mm long and mostly without petioles. The foliage is glabrous except for hairs on the lower leaf margins. Flowers are solitary on long stalks from the upper leaf axils. The sepals are 2-3 mm long, without white margins. Petals are lacking. The mature, egg-shaped capsule is longer than the sepals.

Bluntsepaled chickweed is common in moist, shaded or partially shaded, subalpine habitats in the Sapphire Range. It is not known to occur in the Bitterroot Mountains. B.C. to CA, east to Alta. and CO.

8. Stellaria simcoeii (Howell) Hitchc.

Simco Mtn. Starwort

This starwort has numerous, prostrate to ascending stems, 5-20 cm (2-8 in) long. The delicate, egg-shaped leaves are 8-15 mm long with short petioles. Foliage is spreading-hairy throughout. Flowers are solitary on long stalks in the upper leaf axils. The 4-5 glabrous and white-margined sepals are 2-3 mm long. Petals are minute or lacking. The egg-shaped capsule is longer than the calyx.

The plant has been collected once in our area, on a gravel bar on Reimel Creek southeast of Darby. WA to CA, east to MT and nw. WY.

Vaccaria Medic. Cowherb

Vaccaria segetalis (Neck.) Garcke

Cowherb

[V. pyramidata Medic.]

Cowherb is a taprooted annual with stems, branched above, and up to 40 cm (16 in) tall. The broadly lance-shaped leaves are 4-9 cm (2-4 in) long and without petioles, the lower pairs united around the stem.



a. *Spargula arvensis* b. *Spargularia rubra* c. *Stellaria media* d. *S. longifolia* e. *S. nitens*
 f. *Stellaria calycantha* g. *S. crista*

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The herbage is glabrous. Flowers are borne in an open, flat-topped, leafy-bracted inflorescence. The tubular calyx is 10-nerved, 5-ribbed, and 11-14 mm long. It is usually purplish and becomes greatly enlarged and angled at maturity. The pink petals are shallowly notched and greatly exceed the sepals.

This species occurs in open, disturbed habitats in the valleys. In our area it has been found in overgrazed pastures near Hamilton and on Waterworks Hill, north of Missoula. Native of Europe, introduced into most of North America.

CELASTRACEAE Staff Tree Family

Our members of this family are shrubs with small, inconspicuous flowers borne in the axils of the leaves. The 4-5 sepals are united at the base, and the petals are separate. The fruit is a capsule.

- 1. Leaves alternate; petals white.....Glossopetalon
- 1. Leaves opposite; petals reddish.....Pachistima

Glossopetalon Gray Green-bush

Glossopetalon nevadense Gray

Green-bush

[Forsellesia stipulifera (St. John) Ensign]

Green-bush is a densely branched, deciduous shrub that may grow up to 3 m (10 ft) tall. The spreading, spine-tipped branches have green bark and are grooved lengthwise. The alternate, grayish green leaves are entire, usually broadly lance-shaped, and 3-15 mm long. The white petals are 4-9 mm long, and there are 5-8 stamens. The leathery capsule is grooved lengthwise and about 3 mm long.

A population of these shrubs, all less than 1 m (3 ft) tall, occurs on steep cliffs near Painted Rock Reservoir. ID to CA, east to W. MT, UT, and AZ. (Not illustrated).

Pachistima Raf. Mountain Lover, Mountain Box

Pachistima myrsinites (Pursh) Raf.

Mountain Lover, Myrtle Boxwood

[Paxistima myrsinites (Pursh) Raf.]

This is a low, spreading, evergreen shrub with prostrate to ascending stems, usually 20-60 cm (8-24 in) long. The opposite, broadly lance-shaped leaves are 1-3 cm long, shiny, and deep green with toothed margins. The leaves maintain their color during the winter. The herbage is completely glabrous. The tiny flowers are borne at the base of the upper leaves and bloom in the late spring. The 4 petals are reddish-purple and 1-2 mm long. The fruit is a capsule with 1-2 fleshy-covered seeds.

Mountain lover is common in dry to moist, shaded habitats in the montane and lower subalpine zones. B.C. to CA, east to the Rocky Mountains.

This species seems to occur only in sites that have a relatively high winter snow cover and are at least partially shaded from the afternoon winter sun. In forest sites that have recently been cleared, Pachistima shows extensive damage probably caused by repeated freezing and thawing of exposed tissue during late winter and early spring.

CERATOPHYLLACEAE Hornwort Family

Ceratophyllum L. Hornwort

Ceratophyllum demersum L.

Common Hornwort

Common hornwort is a rootless, submersed or free-floating aquatic forb with slender, lax, much-branched stems up to 4 m (13 ft) long. Sessile leaves, in whorls of 5-12, have blades that are 1-2 times dissected into linear, filamentous segments whose shape varies according to their position on the plant. Minute, male and female flowers, without petals are borne in the leaf axils. Both male and female flowers occur on the same plant. Fruits are achenes with two divergent basal spines and a straight, terminal spine (to 12 mm long) formed from the persistent style.

Hornwort is common in the valleys in standing or slowly flowing water of rivers, sloughs, and ponds. This is a cosmopolitan species.

CHENOPODIACEAE Goosefoot Family

Members of the Goosefoot Family are (in our area) annual or perennial herbs with simple, alternate or occasionally opposite leaves and often angled or jointed stems. The foliage is often "mealy" with thin, flaky scales. The 1-many small flowers are clustered in the leaf axils or in narrow to open terminal inflorescences. Plants and flowers may have one or both sexes present. The flowers have 2-5 usually green sepals, often subtended by 2-5 bracts that enlarge upon maturity. Many of our species are cosmopolitan weeds, while others are native species occurring in calcareous or saline soils.



a. *Stellaria longipes* b. *S. obtusa* c. *S. simcoei* d. *Vaccaria segetalis* e. *Pachistima myrsinites*
 f. *Ceratophyllum demersum* ff. *Glossopetalon nevadense*

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1. Upper leaves and flower bracts spine-tipped.....Salsola kali
1. Leaves and bracts not spine-tipped.....2
2. Leaves narrowly linear-cylindrical, perennial from a woody rootcrown.....Suaeda intermedia
2. Leaves not cylindrical, plants mostly annuals.....3
3. Leaves with straight hairs on the margins and soft hair beneath, not glandular.....Kochia scoparia
3. Leaves either glabrous, whitish mealy or with glandular hairs.....4
4. Flowers lacking sepals, fruit enclosed in a pair of swollen, elliptic to triangular bracts....Atriplex
4. Flowers with 1-5 sepals, fruit not enclosed in swollen bracts.....5
5. Flowers usually with 1 sepal and 1 stamen.....Monolepis nuttalliana
5. Flowers with 3-5 stamens and sepals.....Chenopodium

Atriplex L. Orache, Greasewood, Saltbush

These plants are annual (ours) or perennial herbs or shrubs with mostly alternate leaves and glabrous or scaly herbage. The flowers are unisexual, and individual plants have one or both sexes. Flowers are clustered in the leaf axils or in relatively narrow terminal inflorescences. The females are without a calyx or corolla but are subtended by 2 or more bracts that enlarge in fruit. The bractless male flowers have 2-5 tepals and 5 stamens.

1. Plants grayish with a covering of mealy scales at maturity.....(3) A. rosea
1. Plants greenish at maturity, sparsely or not at all covered with grayish scales.....2
2. Fruiting bracts 6-12 mm wide, larger leaves greater than 7 cm (3 in) long.....(2) A. hortensis
2. Fruiting bracts less than 6 mm wide, leaves less than 7 cm long.....(1) A. patula

1. Atriplex patula L.

Spearscale

This species is an annual with simple or branching stems that are erect or curved at the base and up to 1 m (3 ft) tall. The lower leaves are triangular or arrow-shaped, more-or-less opposite, and 2-7 cm (1-3 in) long, becoming lance-shaped and alternate above. The foliage is covered with thin scales when young. In fruit, the bracts are triangular with entire or toothed margins, the surface smooth or with a few bumps.

Spearscale is a common weed on deep fertile soils of gardens and fields in the valley. Throughout Eurasia and North America.

Our plants are var. hastata (L.) Gray. This species is often confused with Chenopodium album or C. hybridum but can be distinguished by the enlarged bracts.

2. Atriplex hortensis L.

Garden Orache, French Spinach

This plant is an erect annual with angled stems that may be over 1 m (3 ft) tall. The leaves are broadly lance- to spade-shaped, mostly alternate, and 5-20 cm (2-8 in) long. The herbage may be thinly scaly when young but is usually glabrous. The prominent fruiting bracts (sometimes lacking) are elliptic and 6-12 mm wide at maturity.

French spinach is a cultivated vegetable, once collected in a neglected garden below Mount Sentinel in Missoula. Native to Asia and occasionally escaped in North America.

3. Atriplex rosea L.

Red Orache

Red orache is an erect, annual herb with green stems up to 1 m (3 ft) tall that are often branched from the base. The sessile or short-petiolate leaves are covered with grayish scales and have lance- to egg-shaped blades, 2-5 cm (1-2 in) long, with toothed margins and a wedge-shaped base. This plant has separate male and female flowers that are borne in spikes at the end of axillary branches and the main stem, the males mostly above the females. The hardened, fruiting bracts are sessile, united below middle, and 4-6 mm long with toothed margins.

This plant occurs mainly on disturbed soil in open habitats of the valley zone. It may be more common than the single collection from ne. Ravalli County indicates. Introduced from Eurasia and widely introduced into much of North America.

Chenopodium L. Goosefoot, Pigweed

Species in this genus are annuals (ours) with mealy or occasionally glandular foliage. The alternate leaves are usually petiolate and entire, toothed or lobed. Flowers have both sexes and are borne in dense clusters in leaf axils or terminal inflorescences. They have 2-5 green or red sepals, united below and sometimes fleshy. Flower bracts are lacking. There are 5 stamens.

All our members of this genus occur on naturally or man-caused disturbed habitats.

1. Plants glandular and aromatic.....(8) C. botrys
1. Plants not glandular.....2
2. Leaves and inflorescences glabrous or nearly so, flowers in globose clusters.....3
2. Leaves or inflorescences mealy (covered with flaky scales), flowers not in distinct globose clusters.....4
3. Sepals becoming fleshy and reddish in fruit.....(6) C. capitatum
3. Sepals not becoming reddish and fleshy.....(9) C. rubrum
4. Leaves large, (2)3-20 cm (1-8 in) long, egg-shaped to triangular, slightly or not at all whitish-mealy, usually green on both surfaces.....5
4. Leaves either lance-shaped and/or whitish-mealy on both surfaces.....6
5. Leaf blades (5)7-20 cm (3-8 in) long, inflorescence little or not whitish mealy, common.....(2) C. hybridum
5. Leaf blades 2-6(8) cm (1-2 in) long, inflorescence mealy, uncommon.....(3) C. murale
6. Sepals glabrous, stems prostrate or occasionally erect.....(7) C. glaucum
6. Calyx whitish-mealy, stems usually not prostrate.....7
7. Leaves 1-10 mm wide, at least 3 times as long as wide.....(4) C. leptophyllum
7. Leaves mostly more than 10 mm wide or less than 3 times as long as wide.....8
8. Leaves often lobed near the base but not toothed, plants more common in disturbed areas of grasslands.....(5) C. fremontii
8. Leaves of lower stem usually coarsely toothed, plants of gardens, roadsides, and waste areas in the valley.....(1) C. album

Group I. This group contains introduced weeds commonly associated with man-caused disturbances in the valley zone.

1. Chenopodium album L.

Lamb's Quarters

Lamb's quarters has erect stems up to 1.5 m (5 ft) tall. Mature plants often become tinged with red. The leaves are succulent and mealy below and often above. Leaf blades are spade-shaped to triangular, toothed or lobed, and 3-10 cm (1-4 in) long. The flowers are borne in clusters in narrow inflorescences. The sepals are mealy and have a ridge on the back. The seeds are shiny black.

This species is common in gardens and fields. It is typically associated with C. hybridum, Atriplex patula and Sonchus spp. Native of Eurasia, introduced into most of North America.

2. Chenopodium hybridum L.

Sowbane, Maple-leaf Goosefoot

[C. gigantospermum Aellen]

Sowbane is glabrous, except in the inflorescence, and has erect and often branched stems up to 1 m (3 ft) tall. The spade-shaped or triangular leaves are bright green, up to 20 cm (8 in) long and variously toothed or lobed. The inflorescence is made up of small flower clusters on narrow, spikelike branches. The sepals are united only at the base and are not ridged on the back. The seed has minute grooves or pits.

This plant is common in gardens and fields. Native of Eurasia, introduced into much of North America.

3. Chenopodium murale L.

Nettle-leaved Goosefoot

Plants of this species are bright green with stems that are simple or branched from the base and up to 50 cm (20 in) tall. The leaves are egg- or spade-shaped, coarsely toothed, 2-6 cm (1-2 in) long, glabrous above, and sparsely mealy beneath. The flowers are clustered on short branches in the leaf axils and in a compact terminal inflorescence. The sepals are mealy and united only at the base. Seeds are dull with minute ridges or pits.

Nettle-leaved goosefoot is much less common than C. album or C. hybridum. It has been collected on dry, hardened soil along boardwalks on the university campus in Missoula. Native to Eurasia, introduced throughout North America.

This species may be more widespread than our collections indicate.

Group II. The second group consists of mostly native species often found in the montane zone as well as the valleys. Besides occurring in gardens and fields, they can be found along logging roads, in recent clearcuts, and around old homesteads and overgrazed pastures.



a. *Atriplex patula* b. *A. hortensis* c. *Chenopodium album* d. *C. hybridum* e. *C. murale*
 f. *Atriplex rosea*

4. Chenopodium leptophyllum (Moq.) Wats.
[C. subglabrum (Wats.) A. Nels.]

Slim-leaf Goosefoot

These are slender plants with erect, branched stems 20-60 cm (8-16 in) tall. The leaves are linear or narrowly lance-shaped, with entire or few-lobed margins, short petioles, and blades 1-4 cm long. The foliage is usually mealy throughout. Flowers are clustered in short, narrow branches in a leafy inflorescence. Sepals are white-margined and evidently ridged on the back. The seed is smooth and shiny.

This desert species occurs in dry, disturbed habitats such as road shoulders and walkways. It is commonly found with Polygonum aviculare, Monolepis nuttalliana, Kochia scoparia and Salsola kali. East of the Cascades, B.C. to Baja Cal., east to the Great Plains, introduced into e. North America.

5. Chenopodium fremontii Wats.
[C. atrovirens Rydb.]

Fremont's Goosefoot

Fremont's goosefoot has erect, branched stems up to 80 cm (32 in) tall. The leaves are broadly lance-shaped to triangular, entire or lobed at the base, usually 1-4 cm long, green and glabrous above, and sparsely mealy beneath. Flowers are clustered on leafy, spikelike branches. Sepals are mealy and ridged on the back. The seeds are dull and wrinkled.

This plant is most often found in areas of grasslands and open ponderosa pine forest disturbed by livestock in the valley and montane zones. It also occurs along roadsides, occasionally approaching the subalpine zone. East of the Cascades, B.C. to Baja Cal., east to the Great Plains.

6. Chenopodium capitatum (L.) Asch.

Strawberry Blite

Strawberry blite is a glabrous plant with erect, freely branching stems up to 80 cm (32 in) tall. The triangular leaves are toothed or shallowly lobed and petiolate, with blades up to 10 cm (4 in) long, becoming much smaller upwards. Flowers are in dense clusters in the leaf axils. The 3-5 sepals are fleshy and bright red at maturity. The seed is oblong.

Occurs in seasonally or permanently moist habitats with rich soil in the valley or, more often, montane zones. We have one collection from the Rattlesnake Mountains, north of Missoula. Native to Eurasia, introduced into much of North America.

Group III. The third group contains native and introduced species most commonly occurring in wetland and riparian habitats in the valley.

7. Chenopodium glaucum L.

Oakleaf Goosefoot

Plants are dull bluish-green with spreading or prostrate stems that are often reddish and up to 30 cm (12 in) long. The oblong to egg-shaped leaf blades are glabrous above, mealy beneath, 1-3 cm long, and sharply toothed (resembling an oak leaf in outline). The leaf petioles are long and often reddish at the base. The flowers are in compact clusters on short spikelike branches in the leaf axils. The sepals are divided nearly to the base. The seeds are shiny and dark brown.

Oakleaf goosefoot is common in moist to wet, open soil around ponds and on river banks and gravel bars. Alta. to OR, east to the Great Plains, also in Eurasia, Africa and Australia.

8. Chenopodium botrys L.

Jerusalem Oak, Oakleaf Goosefoot

This species is strongly aromatic and freely branched from near the base with stems up to 60 cm (2 ft) tall. The leaves are mostly 2-4 cm long, oblong to oval in outline, and irregularly lobed with wavy margins. The foliage is densely sticky-glandular throughout. Flowers are borne in small clusters on narrow, terminal branches. The sepals are separate to the base. The seed is black.

In our area, only small specimens of this plant have been found below the high water mark on the banks of the Clark Fork River. Elsewhere, it occurs in dry, disturbed soil. Introduced from Eurasia, common in much of temperate North America.

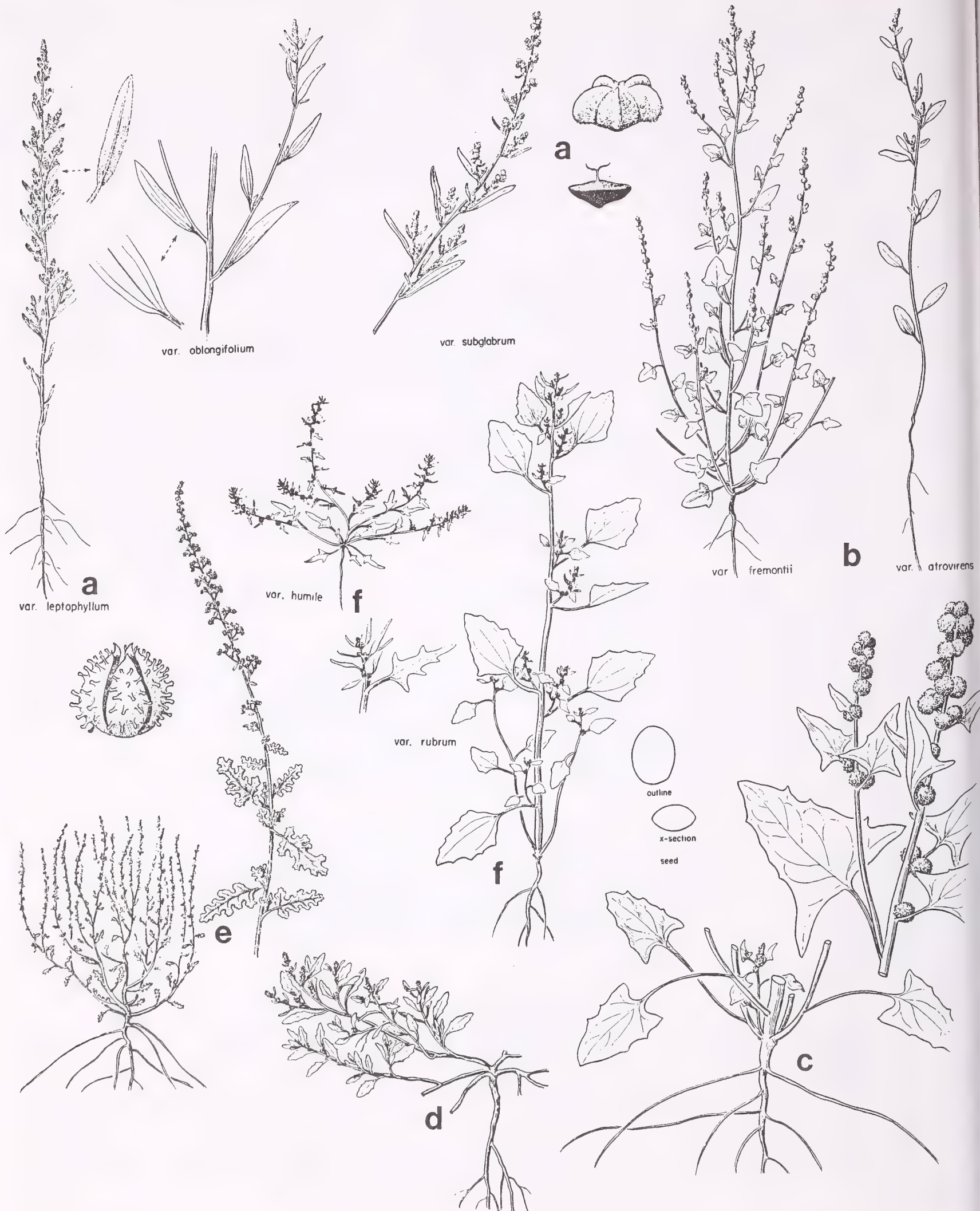
9. Chenopodium rubrum L.

Red Goosefoot

Red goosefoot is a fleshy, spreading plant with branched stems up to 50 cm (20 in) tall that are often tinged with red. The spade-shaped to triangular leaf blades are 1-6 cm long with shallow teeth. The leaves in the inflorescence are smaller, lance-shaped and entire. Foliage is glabrous below the inflorescence. Flowers are crowded on narrow branches in the leaf axils. The sepals are separate to the middle or below.

This plant usually occurs in seasonally wet, heavy, alkaline soils. In our area, one plant was collected in mud on an island in the Clark Fork River near the University of Montana. B.C. to CA, east to the Atlantic Coast.

C. chenopodioides (L.) Aellen, a similar species, occurs just east of our area and may be expected in moist, calcareous, partially shaded habitats in the Sapphire Range.



a. *Chenopodium leptophyllum* b. *C. fremontii* c. *C. capitatum* d. *C. glaucum* e. *C. botrys* f. *C. rubrum*

Kochia Roth Mock CypressKochia scoparia (L.) Schrad.

Summer Cypress

Plants are freely branched, bushy annual herbs with erect stems up to 1 m (3 ft) tall, some turning red later in the season. The alternate, entire leaves are narrowly lance-shaped, tapered at both ends, and up to 6 cm (2 in) long. The herbage is glabrous or covered with hair. Flowers are solitary or in clusters on spikelike, leafy-bracted branches in the leaf axils. The sepals are hairy with papery wings at maturity.

Summer cypress is common in open, disturbed habitats such as agricultural fields, pastures, gardens, and roadsides. Native of Eurasia, introduced throughout the U.S. and Can.

This weed is rapidly spreading throughout w. U.S. It seems able to establish in nearly every soil type.

Monolepis Schrad. PovertyweedMonolepis nuttalliana (Schultes) Greene

Povertyweed

Povertyweed is a low-growing winter annual that has prostrate or ascending, spreading stems up to 30 cm (12 in) long and forms rosettes of leaves in the fall. The somewhat succulent, entire leaves are lance-shaped, broadened and lobed at the base, and 5-30 mm long. Flowers are borne in dense clusters at the leaf bases. The solitary sepal is often reddish. The seed is dark brown.

Occurs in dry, alkaline or saline soil, but in our area, it is most common in open disturbed habitats, such as road shoulders and around buildings and sidewalks. East of the Cascades, B.C. to CA, east to Man., MO, and NM.

Salsola L. Russian ThistleSalsola kali L.

Russian Thistle

[S. iberica Senn. & Pau.]

This species is a many-branched annual with purplish-striped stems up to 1 m (3 ft) tall. The lower leaves are 1-6 cm long and threadlike; upper leaves are awl-shaped and spine-tipped. Herbage is glabrous or pubescent. The whole plant becomes rigid at maturity when it breaks off at the ground level and becomes a "tumbleweed." Flowers are solitary in the leaf axils and subtended by spiny bracts. The 5 purplish, membranous sepals are separate almost to the base. The fruit is cup-shaped.

Russian thistle is common in open, disturbed habitats, particularly agricultural fields, in the valley zone. It was introduced from the steppes of Russia in the 1890's and is now widespread in most of w. North America.

Suaeda Forsk. Sea BliteSuaeda intermedia Wats.

Tall Sea Blite

[S. moquinii (Torrey) Greene]

Plants are perennials with numerous, spreading to erect stems, up to 60 cm (24 in) tall, from a woody rootcrown and a strong taproot. The alternate, entire leaves are linear to long-cylindrical, 1-2 cm long, and reduced upwards. The foliage is glabrous or sometimes covered with a thin waxy coat. Flowers are borne in clusters of 1-3(5) at the base of the leaves. The 5 sepals are rounded on the back, the anthers elevated above them. The seeds are smooth.

Tall sea blite occurs in open, moist to wet, alkaline or saline habitats. In our area, it has been collected once in alkaline soil along a road southeast of Darby. WA to CA, east to Alta. and NM.

COMPOSITAE (Asteraceae)

Sunflower, Aster or Daisy Family

In this family, the flowers are clustered together in heads which, to the casual observer, usually appear as single flowers. Petals of the corolla are united, and the sepals are lacking or represented by a series of hairs, scales, or awns (pappus). The fruit is a dry, 1-seeded achene. Individual flowers are of 2 distinct types: Ray or ligulate flowers have a corolla that is tubular at the base with a long, flattened and usually bent segment above. This flattened portion of the corolla is called the ray or ligule. Disk flowers have a tubular corolla with 5 terminal lobes or teeth. Heads composed of only ray flowers (e.g. dandelion [Taraxacum]) are called ligulate. Heads composed of all disk flowers (e.g. tansy [Tanacetum]) are termed discoid. If both flower types occur in one head (e.g. sunflower [Helianthus]), the ray flowers are always on the outer edge encircling the disk flowers, and these heads are termed radiate. Each head is enclosed by a few to many bracts that collectively are known as the involucre. Flowering heads are borne on the enlarged end of a flowering stalk or peduncle. The inflorescence is composed of 1-many variously



a. *Kochia scoparia* b. *Salsola kali* c. *Monolepis nuttalliana* d. *Suaeda intermedia*

arranged heads. This is the largest family of flowering plants. In our area it is represented by 56 genera and over 200 species. These are principally annual and perennial herbs and a few shrubs.

Key to the Groups of Genera

1. Flowering heads composed entirely of ray flowers, disk flowers absent, sap milky.....GROUP A
1. Flowering heads composed partly or entirely of disk flowers, sap not milky.....2
2. White-woolly herbs with discoid flowering heads, involucre bracts papery, at least the upper portion white.....GROUP B
2. Plants without the above combination of characters, involucre bracts usually greenish.....3
3. Flowering heads composed entirely of disk flowers, ray flowers absent.....4
3. Flowering heads with both ray flowers and disk flowers.....5
4. Corolla of disk flowers yellow or orange.....GROUP C
4. Corollas of disk flowers purple, blue, pink, white, or absent; Xanthium, which has inconspicuous flowers enclosed in burs, is included in this group.....GROUP D
5. Ray flowers yellow or orange.....GROUP E
5. Ray flowers purple, blue, pink, or white.....GROUP F

GROUP A

1. Flowers yellow or orange.....2
1. Flowers purple, blue, pink or white.....15
2. Stems entirely leafless or with a few leaf-like bracts in the inflorescence, leaves all basal.....3
2. Stems with leaves at least on the lower portion.....9
3. Flowering heads solitary on the naked stem.....4
3. Flowering heads 2-many in a branched inflorescence.....6
4. Involucre bracts in 2 distinct series, the outer often reflexed, achenes with spines or points near the summit of the body.....Taraxacum
4. Involucre bracts in 1 or more overlapping series, never reflexed, achenes without spines or points.....5
5. Pappus bristles broad and flattened toward the base, achenes without a narrow beak between the body and the pappus.....Microseris
5. Pappus bristles not broad and flattened toward the base, achenes often with a narrow beak between the body and the pappus.....Agoseris
6. Achenes with a slender beak between the body and the pappus, uncommon weed of disturbed areas.....Hypochaeris radicata
6. Achenes without a conspicuous beak, native species.....7
7. Involucre bracts glabrous.....Microseris
7. Involucre bracts hairy.....8
8. Involucre 8-21 mm high, some leaves usually with backward-pointing lobes.....Crepis runcinata
8. Involucre 6-8 mm high, leaves entire or toothed, without backward-pointing lobes....Hieracium gracile
9. Leaves with entire or shallowly-toothed but not prickly margins.....10
9. Leaves usually deeply lobed; if not, then margins prickly.....13
10. Involucre bracts hairy.....Hieracium
10. Involucre bracts glabrous.....11
11. Stems leafy on the lower 1/2 only.....Microseris nutans
11. Stems leafy to the top.....12
12. Stem leaves triangular or spade-shaped.....Lapsana communis
12. Stem leaves linear.....Tragopogon
13. Achenes not flattened, plants not prickly.....Crepis
13. Achenes usually flattened, plants sometimes prickly on the leaf margins.....14

COMPOSITAE

14. Mature achenes without a slender beak between the body and pappus, heads with 85-250 flowers..Sonchus
 14. Mature achenes with or without a beak, heads with 11-56 flowers.....Lactuca
15. Flowers white, leaves not deeply lobed.....16
 15. Flowers usually purple, blue or pink; if white, then leaves deeply lobed.....17
16. Lower stems and leaves long hairy.....Hieracium albiflorum
 16. Lower stems and leaves glabrous.....Prenanthes sagittata
17. Pappus of minute scales.....Cichorium intybus
 17. Pappus of thin, hair-like bristles.....18
18. Flowers pink; pappus bristles branched and feather-like.....Stephanomeria
 18. Flowers blue or white; pappus bristles unbranched.....Lactuca

GROUP B

1. Involucral bracts almost entirely white and papery, without hairs.....Anaphalis
 1. Involucral bracts with a portion that is colored or hairy.....2
2. Plants annual, often in disturbed areas.....3
 2. Plants perennial, habitats various.....4
3. Flowering heads in the axils of the leaves along the upper 1/2-1/3 of the stem.....Filago arvensis
 3. Flowering heads clustered toward the top of the stem.....Gnaphalium
4. Plants with a taproot, without tufted basal leaves.....Gnaphalium
 4. Plants with fibrous roots, stolons often present.....Antennaria

GROUP C

1. Shrubs with woody stems above ground level.....2
 1. Plants herbaceous.....4
2. Involucre of 4-5 bracts.....Tetradymia canescens
 2. Involucre of 6-many bracts.....3
3. Leaves deeply divided or lobed at the tip.....Artemisia
 3. Leaves entire.....Chrysothamnus
4. Leaves opposite on the stem.....Arnica
 4. Leaves alternate.....5
5. Pappus of slender bristles.....6
 5. Pappus consisting of a low ridge at the top of the achene or lacking.....7
6. Leaf blade deeply lobed into linear segments.....Erigeron compositus
 6. Leaf blade shallowly lobed or entire.....Senecio
7. Flowering heads mostly solitary at the ends of branches, plants annual.....Matricaria matricarioides
 7. Heads many in an inflorescence, plants biennial or perennial.....8
8. Inflorescence narrow or spreading, not flat-topped.....Artemisia
 8. Inflorescence flat-topped.....Tanacetum vulgare

GROUP D

1. Leaves with spines at least 2 mm long on the margins.....2
 1. Leaves without spines on the margins.....3
2. Flower stalks straight, heads held erect.....Cirsium
 2. Flower stalks bent, heads nodding.....Carduus nutans
3. Involucral bracts spiny, fruit of some species a bur.....4
 3. Involucral bracts not spiny.....6
4. Spines of involucre straight.....Centaurea
 4. Spines of involucre hooked.....5

5. Involucral bracts united to form a solid bur; flowers 2, inconspicuous.....Xanthium
 5. Involucral bracts separate; flowers many, apparent.....Arctium
6. Pappus of hairlike bristles, these sometimes branched and feathery.....7
 6. Pappus of scales (broader than bristles) or lacking.....11
7. Pappus bristles branched and feathery.....8
 7. Pappus bristles unbranched.....9
8. Leaves lance-shaped, many greater than 1 cm wide.....Saussurea americana
 8. Leaves linear, less than 1 cm wide.....Liatris punctata
9. Basal leaves large and conspicuous at flowering time.....Petasites frigidus
 9. Basal leaves mostly deciduous by flowering time.....10
10. Involucral bracts mostly of equal length.....Eupatorium occidentale
 10. Involucral bracts not equal in length, in 2-several series.....Brickellia grandiflora
11. Leaves pinnately divided or deeply lobed.....12
 11. Leaves toothed or entire, not deeply lobed or divided.....13
12. Flowers without corollas, plants annual.....Ambrosia
 12. Corollas present, plants perennial.....Chaenactis
13. Leaves conspicuously white beneath, plants of forested habitats.....Adenocaulon bicolor
 13. Leaves not white beneath, plants of sunny habitats.....Iva

GROUP E

1. Pappus composed of simple or branched hair-like bristles.....2
 1. Pappus a low crown or lacking or composed of scales or awns, wider than hair-like bristles.....9
2. Leaves opposite on the stem.....Arnica
 2. Leaves alternate or basal.....3
3. Involucral bracts of equal length (except for a few small ones at the base of the involucre), not much overlapping.....Senecio
 3. Involucral bracts in 2-several series, often overlapping.....4
4. Leaves mainly basal, stem leaves reduced, less than 3 mm wide.....5
 4. Stem leaves conspicuous, mostly greater than 3 mm wide.....6
5. Involucral bracts glabrous, black at the tip.....Haplopappus acaulis
 5. Involucral bracts hairy, green throughout.....Erigeron linearis
6. Involucre 2-6 mm high, rays mostly less than 6 mm long.....7
 6. Involucre greater than 6 mm high, rays greater than 6 mm long.....8
7. Flowering heads usually solitary.....Haplopappus uniflorus
 7. Flowering heads several to many.....Solidago
8. Plants herbaceous with basal leaves deciduous by flowering time.....Chrysopsis villosa
 8. Plants shrubs or herbaceous with persistent basal leaves.....Haplopappus
9. Lower stem leaves pinnately divided.....10
 9. Lower stem leaves with entire, toothed or lobed margins, not deeply divided.....13
10. Plants covered with dense white hair.....Eriophyllum lanatum
 10. Plants not densely white-hairy.....11
11. Rays lobed at the tip, plants occurring along rivers.....Coreopsis atkinsoniana
 11. Rays entire or with minute teeth at the tip.....12
12. Flowering heads columnar in shape, 1.5-4 cm tall, rays greater than 1.5 cm long..Ratibida columnifera
 12. Flowering heads more disk-shaped, less than 1 cm tall, rays less than 1.5 cm long..Anthemis tinctoria
13. Rays 3-lobed at the tip.....14
 13. Rays entire-margined at the tip.....15
14. Rays reflexed downward, disk flowers yellow.....Helenium autumnale
 14. Rays not reflexed, disk flowers purple.....Gaillardia aristata

COMPOSITAE

15. Involucral bracts hairy.....16
 15. Involucral bracts glabrous.....19
 16. Stem leaves lacking, only 1-2 narrow bracts present, basal leaves large and triangular shaped.....Balsamorhiza sagittata
 16. Stem leaves not greatly reduced.....17
 17. Plants occurring at timberline or above.....Hulsea algida
 17. Plants occurring in the montane zone or below.....18
 18. Flowering heads large, rays greater than 1 cm long.....Helianthus
 18. Flowering heads small, rays less than 5 mm long.....Madia
 19. Lower stem leaves opposite.....Bidens cernua
 19. Lower stem leaves alternate.....20
 20. Rays large, more than 2.5 cm long.....Wyethia amplexicaulis
 20. Rays smaller, less than 2 cm long.....21
 21. Involucral bracts resinous, rays 7-15 mm long.....Grindelia squarrosa
 21. Involucral bracts not resinous, rays mostly 2-3 mm long.....Gutierrezia sarothrae

GROUP F

1. Flowering heads without true rays, but marginal disk flowers enlarged and resembling ray flowers.....Centaurea
 1. True ray flowers present.....2
 2. Pappus of simple or branched hair-like bristles.....3
 2. Pappus of scales or awns (wider than bristles) or lacking.....8
 3. Plants annual, involucre 2-4 mm high.....Conyza canadensis
 3. Plants biennial or perennial, involucre greater than 4 mm high.....4
 4. Teeth of leaf margins spine-tipped.....Machaeranthera canescens
 4. Leaves without spines on the margins.....5
 5. Basal leaves triangular in outline, white-woolly beneath.....Petasites sagittatus
 5. Basal leaves narrower in outline, usually not white-woolly.....6
 6. Involucre usually more than 1 cm high, heads (not including rays) generally more than 2 cm wide, basal leaves numerous and linear lance-shaped.....Townsendia parryi
 6. Flowering heads usually smaller, if as large, then leaves different.....7
 7. Involucral bracts subequal and not much overlapping, plants at lower elevations usually flowering before mid-summer.....Erigeron
 7. Involucral bracts in 2-several series and overlapping, plants at lower elevations usually flowering in mid-summer or later.....Aster
 8. Leaves pinnately divided.....9
 8. Leaves entire, toothed or lobed, not deeply divided.....11
 9. Rays less than 5 mm long.....Achillea millefolium
 9. Rays greater than 5 mm long.....10
 10. Papery, scale-like bracts between the disk flowers, plants ill-smelling.....Anthemis cotula
 10. Bracts between the disk flowers lacking, plants not ill-smelling.....Matricaria maritima
 11. Stems leafless, usually occurring in lawns.....Bellis perennis
 11. Stems leafy, plants of disturbed meadows grasslands and roadsides.....Chrysanthemum leucanthemum

Achillea L. YarrowAchillea millefolium L.

Yarrow, Milfoil

Milfoil is a fibrous rooted and often rhizomatous perennial. Plants have 1-several stems that are upright, simple, or sometimes branched below the inflorescence. The stems and foliage are variously woolly-hairy, and the leaves are alternate, narrowly oblong in outline, and finely dissected into many linear segments. Flowering heads are borne in flat-topped, terminal clusters and appear from May until early fall. The heads are radiate. Both the disk and ray flowers are white or occasionally pinkish.

The species is composed of many different ecotypic forms. There are two varieties in our area. Var. lanulosa (Nutt.) Piper is the common form throughout our area. Var. alpicola (Rydb.) Garrett, which has dark brown margins on the involucre bracts, occurs only in the timberline zone of the high peaks south of Lost Horse Creek. Yarrow is distributed throughout the northern hemisphere from valleys to above timberline.

This species is an aromatic and bitter-tasting plant used medicinally by native peoples.

Adenocaulon Hook. Trail-plant, Pathfinder

Adenocaulon bicolor Hook.

Pathfinder

This is a slender, single-stemmed perennial herb up to 90 cm (3 ft) tall. The large, arrow-shaped leaves are alternate and arise mostly near the base of the plant. They are deep green and glabrous above and densely white-woolly beneath, thus the name bicolor. The discoid heads are small and inconspicuous and borne on long, thin branches of the open inflorescence. The corollas are white, and flowers are without a pappus. The achenes have stalked glands above which cause them to stick to passing hikers and wildlife.

This species occurs in the bottoms of the lower canyons on both sides of the Bitterroot Valley. It is most common in areas dominated by western red cedar and western larch. Pathfinder is endemic to moist evergreen forests of w. North America; B.C. to CA, east to MT, n. MN, and MI.

Agoseris Raf. Mountain Dandelion, Agoseris

These are annual or perennial, taprooted, erect and leafless (scapose) herbs with milky juice. They resemble dandelions. Leaves are basal or confined to the lower stem. The involucre is bell-shaped to cylindrical, and solitary at the end of elongated stalks (peduncles). Flowers are all ligulate (ray flowers), and the pappus is composed of numerous soft, white, hairlike bristles. The fruit is an achene, that extends at the top into a slender beak. The beak is evident only when the fruit is mature. The achene is conspicuously about 10-nerved.

1. Plant a small annual; involucre less than 13 mm high.....(4) A. heterophylla
1. Plant larger, perennial, involucre greater than 10 mm high.....2
2. Flowers orange when fresh, beak of achene 1/2-2 times as long as the body.....(2) A. aurantiaca
2. Flowers yellow when fresh, beak of achene 2-4 times as long as the body or less than 1/2 as long as the body.....3
3. Beak of mature achene less than 1/2 as long as body, outer involucre bracts narrow.....(1) A. glauca
3. Beak of mature achene 2-4 times as long as body, outer involucre bracts distinctly broader and shorter than the inner.....(3) A. grandiflora

1. Agoseris glauca (Pursh) Raf.

False Dandelion

The leaves of this species are linear, lance-shaped, or oblong in outline with margins that are entire, toothed or deeply dissected. Foliage is often glabrous and bluish-green but may also be white hairy. The flowers are yellow and fade to pink or purple upon drying.

False dandelion, with its many varieties, is the most common member of the genus in our area. Var. glauca has mostly glabrous and entire leaves that are pointed at the tip. It is widespread at lower elevations in open, grassy habitats, where it grows up to 30 cm (1 ft) tall. The leaves of var. dasycephala (T. & G.) Jeps. are entire or weakly toothed near the base and oblanceolate or broader in outline. The entire plant is more or less hairy throughout and up to 20 cm (8 in) tall. This variety occurs in scattered locations in the southern part of our area in the subalpine zone. Var. agrestis (Osterh.) Jones is generally taller than the previous variety and has deeply incised leaves and partially pinkish involucre bracts. This variety is uncommon in our area. In a number of locations, such as the Bitterroot Wildflower Area west of Hamilton and the Painted Rock Cliffs, A. glauca is represented by small plants with green involucre bracts in two length classes. These plants may be referred to the var. laciniata (D.C. Eat.) Smiley, but they may also be a transitional form between the latter two varieties. B.C. to CA, east to AZ, Man., and MN.

Members of the related genus Microseris may be confused with A. glauca; however, the former generally have stems with at least a few leaves near the base and pappus bristles with some long hairs, while the latter have only basal leaves and no hair on the pappus bristles.

2. Agoseris aurantiaca (Hook.) Greene

Orange Agoseris

The leaves of this species are usually narrow, entire-margined and pointed at the tip. Occasional plants have leaves that are more rounded or with a few slender, divergent lobes toward the base. Depending on elevation, the plants vary in height from 10-30 cm (4-12 in). This is a conspicuous plant because of its light reddish-brown to burnt orange flowers that turn pinkish or purple with age or upon drying.

COMPOSITAE

Orange agoseris is found in moist, open or partially shaded slopes from montane to timberline zones throughout our area. B.C. to CA, east to NM and Que.

3. Agoseris grandiflora (Nutt.) Greene

Large-flowered Agoseris

This is a taller and coarser plant than other members of the genus. The leaves are entire or variously toothed or lobed. The flowers are yellow, turning pinkish with age. The relatively large size of the flowering heads and the contrasting short outer and long, pointed inner involucral bracts are good diagnostic characters.

In our area this species is known to occur only in Cold Creek Meadows near Lolo Hot Springs. B.C. to CA, east to NE and MT

4. Agoseris heterophylla (Nutt.) Greene

Annual Agoseris

This is the only annual member of the genus in our area. Annual agoseris is a small (to 15 cm or 6 in), slender plant with a weak, easily extracted taproot. Leaves are pinnately divided to entire-margined. The flowers are yellow, turning pink with age.

Found in open ponderosa pine forests only in the Bitterroot Wildflower Area west of Hamilton and on east-facing rhyolite outcrops near the mouth of Gash Creek Canyon. In this latter site it occurs in dense colonies amongst Balsamorhiza. B.C. to CA, east to AZ and Alta.

Ambrosia L. Ragweed

Species in this genus are annual (ours) or perennial herbs with opposite or alternate leaves. Flowering heads are small, discoid and unisexual and are born in a spikelike inflorescence. Flowers are without a pappus. The fruiting involucre is closed and nutlike. Leaves are deeply lobed or dissected.

Two annual species, probably introduced in our area, are uncommon and do not appear to be spreading. Both species have been found along the Northern Pacific railroad tracks west of the Missoula station near the cemetery. The wind-pollinated ragweeds are a notorious cause of hay fever in areas where they are common.

1. Leaves palmately 3-5 lobed or occasionally entire.....(2) A. trifida
1. Well developed leaves 1-2 times pinnately divided.....(1) A. artemisiifolia

1. Ambrosia artemisiifolia L.

Annual Ragweed

This species has stems, 10-100 cm (4 in-3 ft) high, that branch above. The leaves are opposite below and alternate above, usually twice pinnately divided, and elliptical or ovate in outline.

Throughout U.S. and s. Can. except the desert Southwest.

2. Ambrosia trifida L.

Giant Ragweed

Giant ragweed may have stems over 2 m (6 ft) in height. The large leaves are opposite, usually 3-5 lobed, and rough to the touch.

Throughout North America east of the Rocky Mountains and occasionally introduced to the west.

Anaphalis DC. Pearly Everlasting

Anaphalis margaritacea (L.) B. & H.

Pearly Everlasting

Plants are vigorously rhizomatous perennials with distinctive white, woolly leaves and stem. The few basal leaves are soon deciduous. Stem leaves are alternate, without petioles, entire margined, and linear or oblong in outline. Plants are usually 20-40 cm (8-16 in) tall but vary considerably in height, leaf shape, and pubescence. Flowering heads are discoid with yellow flowers surrounded by conspicuous, papery, white involucral bracts. The heads are borne in a flat-topped to rounded terminal cluster.

A very attractive plant, pearly everlasting is common in disturbed ground of clearcuts and along logging and mining roads in the montane and subalpine zones throughout our area. Asia and North America, south to CA, AZ, and NC.

Anaphalis is distinguished from members of the closely related genus Antennaria (pussy-toes) by its relatively large and spreading stem leaves and lack of persistent basal foliage. It can be distinguished from species in the genus Gnaphalium (cudweed) by its strongly rhizomatous habit and its bright white appearance.

Antennaria Gaertn. Pussy-toes

Plants are perennial, herbaceous species with persistent basal foliage and often with a stoloniferous, mat-forming habit. Cauline leaves are small, alternate and entire-margined, covered partly or entirely with white, woolly hair. Flowers of the two sexes are born on separate plants (dioecious).



a. *Achillea millefolium* b. *Adenocaulon bicolor* c. *Agoseris glauca* d. *A. aurantiaca* e. *A. grandiflora*
 f. *Agoseris heterophylla* g. *Ambrosia artemisiifolia* h. *A. trifida*

COMPOSITAE

The discoid flowering heads are solitary or clustered at the ends of the stems. The small, white flowers are surrounded by bracts that are typically hairy below with a glabrous and membranous portion varying in color from white or pink to dark brown or black. The pappus consists of numerous hairy bristles.

1. Plants less than 5 cm (2 in) high, with solitary flowering heads on the ends of the stems.....(1) A. dimorpha
1. Plants usually greater than 5 cm high, several to many heads per stem.....2
2. Upper leaf surface of older basal leaves distinctly greener and less hairy than the lower surface....3
2. Upper and lower surfaces of mature basal leaves scarcely different in color or amount of pubescence..4
3. Leaves large and broad (up to 6 X 2.5 cm, 2 X 1 in); inflorescence open and elongated.(12) A. racemosa
3. Leaves much smaller, inflorescence compact.....(11) A. neglecta
4. Plants forming mats, leafy stolons usually present, basal leaves often blunt-tipped and oblanceolate or broader.....5
4. Plants not forming mats, stolons few or absent, basal leaves long and slender.....10
5. Membranous tip of outer and middle involucral bracts brownish to blackish green.....6
5. Membranous tip of outer and middle involucral bracts white or pink, sometimes with a black spot toward the base.....8
6. Membranous tip of outer and middle involucral bracts brownish to blackish green, usually sharp pointed; plants of high elevations.....7
6. Membranous tip of outer and middle involucral bracts light brown or dull yellowish, usually rounded, often white at the margins; plant of all elevations.....(6) A. umbrinella
7. Leaf tips of upper stem leaves with dry, papery (scariose) appendage ("flag").....(5) A. alpina
7. Leaf tips of upper stem leaves sharp pointed to acuminate without papery appendage.....(7) A. media
8. Membranous tips of involucral bracts white or pink, with a conspicuous dark spot near the base.....(3) A. corymbosa
8. Membranous tips of involucral bracts without dark spot at the base.....9
9. Flowering heads relatively large, the involucre usually 7-11 mm high.....(4) A. parviflora
9. Flowering heads smaller, the involucre 4-7 mm high.....(2) A. microphylla
10. Involucral bracts membranous throughout and hairless or nearly so.....(10) A. luzuloides
10. Involucral bracts with basal portion hairy and non-membranous.....11
11. Plants mostly less than 20 cm tall, alpine or subalpine.....(9) A. lanata
11. Plants usually greater than 20 cm tall, lower elevations.....(8) A. anaphaloides

Group I. This group contains only one species, dwarf plants with an inflorescence of a solitary flowering head.

1. Antennaria dimorpha (Nutt.) T. & G.

Dwarf Pussy-toes

This species is not rhizomatous, but the dense, silvery foliage forms small mats. It is the only species of this genus in our area with an inflorescence consisting of a solitary flowering head. These heads appear in early spring on very short, leafy stems. The involucral bracts of the staminate (male) heads are partly blackish-green or brown, while the pistillate (female) heads have narrower involucral bracts that are nearly twice as long as those of the males and tinged with brown or reddish brown.

This little plant is common on dry, overgrazed benchlands and foothills in the valley and montane zones throughout our area. B.C. to CA, east to MT, NE, and CO.

In late summer the dry, shrivelled basal leaves resemble a lichen more than a flowering plant.

Group II. The second group consists of species usually thought of as "typical" pussy-toes, i.e. stoloniferous, mat-forming plants of medium height (ca. 10-12 cm, 4-5 in) with predominantly dense, white, hairy foliage, small stem leaves, and relatively compact inflorescences. Several of these species tend to hybridize, and intermediate forms, many of them apomictic (producing seed asexually) are common and may be difficult to identify.

2. Antennaria microphylla Rydb.

Rosy Pussy-toes

[A. rosea Greene]

Rosy pussy-toes has slender stems that, at lower elevations, can be up to 30 cm (1 ft) tall. The leaves are narrowly oblong to spoon-shaped and up to 3 cm long. Flowering heads are borne in a compact or

occasionally more open inflorescence. The involucre bracts are blunt at the tip and completely white or often various shades of pink.

This species is common in dry, open habitats from the valley floor to the alpine zone throughout our area. AK to CA, east to Ont. and NM.

A. microphylla frequently hybridizes with A. umbrinella and occasionally with A. alpina.

3. Antennaria corymbosa E. Nels.

Meadow Pussy-toes

Similar to the previous species, meadow pussy-toes has linear to narrowly lance-shaped basal leaves. The involucre bracts are green and woolly at the base and white and membranous above with a conspicuous dark spot at the base of the membranous portion. The leafy stolons are spreading and upturned at the ends, not forming regular mats.

This species is scattered in moist or seasonally wet meadows in the montane and subalpine zones on the west side of our area. Eastern OR to CA, east to CO and MT.

Hybrids involving this species have not been found in our area.

4. Antennaria parviflora Nutt.

Nuttall's Pussy-toes

This species is also similar to A. microphylla, but the lance- to spoon-shaped leaves are distinctly wider. Stems are short and stout, and the plant often forms large mats of attractive, white woolly ground-carpeting foliage. The involucre bracts are blunt at the tip, and the membranous portion is clear white or often pink.

A. parviflora is a Great Plains species and is common only on open slopes and in dry meadows in the valleys and foothills. B.C. to NV, east to NM and Great Plains.

This is a distinctive species not known to hybridize in our area.

5. Antennaria alpina (L.) Gaertn.

Alpine Pussy-toes

Alpine pussy-toes is usually less than 10 cm (4 in) tall. The basal leaves are lance- to spoon-shaped. The membranous portion of the involucre bracts is blackish-green or occasionally brown. The inner bracts are mostly slender and pointed. The upper cauline leaves are tipped by a scarious appendage.

This species is rare in the Bitterroot Mountains. It occurs in small populations mainly in the subalpine and timberline zones in cool, open, moist habitats such as high north slopes, meadows in upper cirques, and in late melting snowbeds. Circumboreal, south to CA and CO.

6. Antennaria umbrinella Rydb.

Umbel Pussy-toes

This species appears intermediate between A. microphylla and A. alpina. The leaves look much like those of the former. The outer involucre bracts are rounded at the tip and yellowish or grayish-brown or sometimes green at the base. The inner bracts are usually dull white.

A. umbrinella is one of our most common and widespread species. It is quite variable. Its many forms, including hybrids, can be found forming large populations from grasslands in the valleys up to dry summits in the alpine zone. Across Can., south to CA and AZ.

Plants that are woody at the base are common in sagebrush grasslands and open ponderosa pine forests. These plants develop short, branched, slightly upturned stolons that bear the clusters of flowering heads on relatively short stems. The involucres of these heads are dirty yellow to golden brown throughout.

7. Antennaria media Greene

Mountain Pussy-toes

[A. alpina (L.) Gaertn. var. media (Greene) Jeps.]

A small, mountain plant looking much like A. alpina, with green-black or brown involucre bracts. The upper cauline leaves are sharply pointed and not tipped by a rough-textured appendage ("flag") as in A. alpina.

A. media is fairly common in the timberline and alpine zones of the Bitterroot Mountains, but often represented by forms that are assumed to be hybrids with A. umbrinella, less commonly with A. microphylla. From Canadian Rocky Mountains to CA and CO. (Not illustrated).

Group III. The third group contains species that are usually taller and with better developed stem leaves. The basal leaves are either completely covered with dense white hair or white-hairy below and green above. The species are all distinct, and no hybridization is known to occur.

8. Antennaria anaphaloides Rydb.

Tall Pussy-toes

This species does not have rhizomes. The stems are up to 50 cm (20 in) tall, and the tufted basal leaves are lance-shaped and distinctly 3-nerved. Plants are white-woolly throughout. Flowering heads are numerous in a wide, flat inflorescence. The involucre bracts are white, often with a small, dark spot at the base.

This species occurs in small, widely scattered colonies from open ponderosa pine forests to dry subalpine meadows. Subalpine plants are more compact than those from lower elevations, and the involucre bracts sometimes are washed with pink or red. B.C. to OR, east to CO and MT.

COMPOSITAE

9. Antennaria lanata (Hook.) Greene

Woolly Pussy-toes

This species has stems up to 20 cm (8 in) tall, and both stems and foliage are densely and persistently white-woolly throughout. The erect basal leaves are tufted and persistent with 3-5 obscure veins. Flowering heads are borne in a compact inflorescence. The membranous portion of the outer involucre bracts is dark brown to greenish black, but the tips of the inner bracts are white.

The plant is restricted to the subalpine zone and above. It is common in open forests and meadows where snow lies late in our high mountains. It is more common in the northern part of the Bitterroot Range, where it is often associated with species of heather (Phyllodoce, Cassiope). B.C. to OR, east to Alta., MT, and WY.

10. Antennaria luzuloides T. & G.

Rush Pussy-toes

The stems of rush pussy-toes are 15-30 cm (6-12 in) tall and clustered on a branched, woody caudex. The herbage is white-woolly, and the generally tufted basal leaves are narrowly lance-shaped. The numerous, small flower heads are borne in a compact or somewhat expanded inflorescence. Involucre bracts are greenish-brown at the base and white above.

This species is locally common in dry, open, montane forests and occasionally in the foothills. B.C. to CA, east to MT and CO.

11. Antennaria neglecta Greene

Field Pussy-toes

Field pussy-toes has 3-nerved, lance- to spoon-shaped basal leaves that are white-woolly beneath and green and nearly glabrous on the upper surface. The stems are up to 40 cm (16 in) tall with sessile, narrow leaves. The stolons are usually short and leafy. Flowering heads are numerous in a dense to somewhat open inflorescence. The white involucre bracts are narrow and pointed at the tip.

The plant occurs sporadically in dry meadows and open forests in the valley to the lower subalpine zones in the northern part of our area. AK to Newf., south to CA, AZ, and VA.

Male plants are rare in the Pacific Northwest.

12. Antennaria racemosa Hook.

Raceme Pussy-toes

This species has leafy stolons and stems up to 50 cm (20 in) tall. The persistent basal leaves have short petioles and are elliptical to almost round in outline. They are densely white-hairy beneath and dull, dark green and nearly glabrous above. The flowering heads are borne on slender peduncles in a very open arrangement. Plants from high elevations have a more crowded inflorescence. The bracts of the involucre are nearly glabrous, pale green below, and clear, pale brown or reddish above.

A. racemosa is the only shade-loving member of the genus in our area. It is common in cool montane and subalpine forests, particularly on north slopes where it can often be found along roads and in other disturbed areas. B.C. to OR, east to Alta., MT and WY.

Anthemis L. Mayweed, Dog Fennel

Species in this genus are annual or short-lived perennial herbaceous plants with radiate flowering heads. Ray flowers are yellow or white. Our species are introduced European weeds.

- 1. Ray flowers white.....(1) A. cotula
- 1. Ray flowers yellow.....(2) A. tinctoria

1. Anthemis cotula L.

Dog Fennel

Dog fennel is a tall (to greater than 50 cm, 20 in) and often profusely branched annual with ill-smelling herbage. The leaves are alternate and 2-3 times pinnately dissected into countless very narrow segments. Flowering heads have white rays and resemble a daisy. The bracts of the involucre are narrow and taper to a long point.

This species is occasionally introduced along roads and in other disturbed areas in the valley and montane zones. Cosmopolitan.

Matricaria maritima, which is odorless and has broader, rounded involucre bracts, is often confused with this plant.

2. Anthemis tinctoria L.

Golden Chamomile

This is a short-lived perennial, usually branched above and with long-hairy herbage. The leaves are pinnately divided into lobed or toothed segments. Ray flowers are yellow.

In our area, this plant occasionally escapes, but it does not appear to be established. Widespread but scattered in North America.

In Europe this attractive plant was originally a noxious weed of clover fields but has since been brought into cultivation for horticultural purposes.



a. *Anaphalis margaritacea* b. *Antennaria microphylla* c. *A. dimorpha* d. *A. corymbosa* e. *A. luzuloides*
 f. *Antennaria parvifolia* g. *A. alpina* h. *A. anaphaloides* i. *A. lanata* j. *A. neglecta* k. *A. racemosa*
 kk *A. umbrinella*

Arctium L. BurdockArctium minus (Hill) Bernh.

Common Burdock

This is a tall, coarse biennial up to 1.5 m (5 ft) high. The heart-shaped leaves are up to 30 cm long and 25 cm wide (12 X 10 in); the lower surface is thinly hairy, the upper surface is nearly glabrous. The large discoid heads have purple flowers and narrow, hooked-tipped involucre bracts. These bracts spread in fruit and form the "sticky" burs that are so familiar.

Burdock is a Eurasian weed now common throughout most of the U.S.

The burs seem to be attractive to children, and this may be the reason that the species is more common in suburbs of our towns than anywhere else.

Arnica L. Arnica

These plants are fibrous-rooted, single-stemmed perennials from a rhizome or caudex. The rootstock produces a cluster of leaves one year and a flowering stalk the next. The stems are simple or branched above. Leaves are simple and opposite. Flowering heads, 1-several per stem, are radiate or discoid. The flowers are yellow to orange and often showy. The involucre bracts are green and in 1 series. The pappus is of fine bristles, white to tawny in color. All our species are natives.

1. Stem leaves usually 5-12 pairs.....2
1. Stem leaves fewer than 4 pairs.....3
2. Heads hemispheric, bracts with a tuft of long hairs at the tip, plants of low elevation riparian habitats.....(7) A. chamissonis
2. Heads bell-shaped, bracts without a distinct tuft of hairs at the tip, plants of high elevations.....(9) A. longifolia
3. Flowering heads without rays and nodding in the bud.....(4) A. parryi
3. Flowering heads radiate.....4
4. Pappus straw-colored or tawny, the hairs on the bristles relatively long, not stiff; flowering stems usually without tufts of basal leaves.....5
4. Pappus white, the hairs on the bristles short and stiff; stems often with tufts of basal leaves.....6
5. Heads relatively narrow, conical in shape.....(3) A. diversifolia
5. Heads broader, hemispheric in shape.....(8) A. mollis
6. Basal leaves broadly arrow- or heart-shaped, less than 3 times as long as wide, some usually toothed.....7
6. Basal leaves narrow to lance-shaped, more than 3 times as long as wide, usually entire-margined or nearly so.....8
7. Leaves mostly heart-shaped; lowest stem leaves the largest.....(1) A. cordifolia
7. Leaves mostly ovate, rarely 1 or 2 heart-shaped; middle stem leaves the largest or as large as the lowest ones.....(2) A. latifolia
8. Heads with mostly 7-10 ray flowers, plants of timberline and above.....(10) A. rydbergii
8. Heads with mostly 10-23 ray flowers, plants of lower elevations.....9
9. Old leaf bases with tufts of brown hairs at the base, plants of mesic habitats.....(6) A. fulgens
9. Old leaf bases without brown hairs at the base, plants of dry habitats.....(5) A. sororia

Group I. The first group contains species with relatively wide leaves (less than twice as long as broad) that have pinnate or palmate venation and usually with teeth on the margins. They are commonly found growing in moist to seasonally moist, well-drained soils. These are our most common species; both are generally found in forested areas from valleys to timberline.

1. Arnica cordifolia Hook.

Heartleaf Arnica

Generally 20-40 cm (8-16 in) tall, this species has the lower stem leaves larger than the middle or upper ones. The leaves are generally long-petioled with heart-shaped blades. The flowering heads are large and cup- or bell-shaped, 1 or occasionally 3 on each stem. The bracts of the involucre are about 5 mm long and evidently hairy. The pappus is white. Clusters of sterile, basal leaves are common, particularly in deeply shaded areas.

Var. cordifolia is abundant in forests in the montane zones but becomes less common with increasing elevation. The dwarf, high elevation var. pumila (Rydb.) Maguire occurs on moist, open slopes and has been collected once on White Mountain in the southern Bitterroot Mountains. AK to CA, east to NM and MI.

2. Arnica latifolia Bong.

Mountain Arnica

This plant resembles A. cordifolia, but the middle pair of cauline leaves is without petioles and at least as large as the lowest pair. The basal leaves are similar to those of A. cordifolia but are a lighter, lettuce green color and have far less prominent venation. The flowering heads are slightly smaller and more vase-shaped. The involucre bracts appear glabrous, although they may be slightly hairy. The pappus is white or nearly white.

In our high mountain forests, this species, represented by var. latifolia, is more common than any other species of Arnica. Near or above timberline, this variety occurs in a dwarf, very aromatic form that has two pairs of cauline leaves that are often entire-margined. Var. gracilis (Rydb.) Cronq. is a low-growing, slender, tufted plant with greatly shortened rhizomes. It has several flowering heads per stem. This variety is locally common on cliffs and open, rocky slopes in the southern Bitterroot Mountains, occurring most frequently in the montane zone. AK to CA, east to Alta, MT, and CO.

3. Arnica diversifolia Greene

Sticky Arnica

The leaves of this species vary in shape from ovate to elliptical, with the middle pair evidently the largest. Petioles are short and often winged. Plants generally have 3 flowering heads per stem. The heads are narrow and the involucre bracts are glandular and sticky to the touch. The pappus is buff or straw-colored.

This highly variable species is thought to be a group of hybrids involving A. mollis or A. amplexicaulis as one parent, and A. cordifolia or A. latifolia as the other (A. Cronquist, Vascular Plants of the Pacific Northwest Part 5, 1955). It occurs sporadically in open forests from mid- to high elevations in the mountains. AK to CA, east to Alta, MT, and UT.

4. Arnica parryi Gray

Nodding Arnica

Nodding arnica has stems, usually 30-50 cm (12-20 in) tall, that are long-hairy below and glandular above. Leaves are lance-to egg-shaped. The lowest are the largest, and the upper lack petioles. This is our only Arnica species with several discoid (lacking rays) flowering heads that nod while in bud. The heads are bell-shaped. The pappus is tawny.

This species is uncommon, occurring in open, mesic slopes in the montane and lower subalpine zones in the southern part of our area. B.C. to CA, east to Alta. and CO.

Group II. The second group consists of species with relatively narrow leaves, lance-shaped to narrowly elliptical in outline, with parallel venation. The foliage is variously hairy and/or glandular and appears dull to grayish-green. These species are most common in open habitats from the valley bottom up into the upper montane zone.

5. Arnica sororia Greene

Twin Arnica

This species has stems 20-60 cm (8-24 in) tall, with a cluster of large, petioled, basal leaves and 2-4 pairs of small, lance-shaped leaves, that gradually decrease in size upward. Flowering heads are relatively flat, and there are often 2-3 per stem. Flowers are pale to deep yellow, with ray flowers up to 2.5 cm (1 in) long.

This is our most common species in this group, generally found in dry, low-elevation habitats such as bare hillsides, sagebrush slopes, and open ponderosa pine forests. B.C. to CA, east to Alta. and UT.

6. Arnica fulgens Pursh

Orange Arnica

Similar in appearance to A. sororia; however, the basal leaves have tufts of brown hairs where they meet the stem. The flowering heads are generally solitary and are somewhat larger and showier than those of A. sororia.

This species is widespread but uncommon in mesic sites such as moist meadows, open north slopes, and protected depressions at low to mid-elevations. B.C. to CA, east to Sask. and CO.

7. Arnica chamissonis Less.

Leafy Arnica

Stems of leafy arnica are 20-100 cm (8-40 in) tall, with 5-8 pairs of narrowly lance-shaped leaves held at a relatively wide angle. Basal leaves are absent and the lowest pair of stem leaves are soon deciduous; thus, mature plants appear leafless on the lower portion. Lower leaves are somewhat larger and more petiolate than those above. There are generally 3 flowering heads per stem. Ray flowers are pale yellow, and the involucre bracts have a tuft of white hairs at the tip.

Occurs in seasonally flooded and often permanently moist habitats. In our area it is locally common on grassy banks and in willow thickets and cottonwood forests on the floodplains of the Clark Fork and Bitterroot rivers. AK to CA, east to NM and Ont.

Group III. The third group consists of species which have few similarities except that, in our area, all are found through the subalpine zone and occasionally to above timberline.



a. *Anthemis cotula* b. *A. tinctoria* c. *Arctium minus* d. *Arnica latifolia* e. *A. cordifolia*
 f. *Arnica diversifolia* g. *A. parryi* h. *A. sororia*

8. Arnica mollis Hook.

Hairy Arnica

A variable species, the stems are 20-60 cm (8-24 in) tall with 2-4 pairs of broadly lance-shaped to ovate leaves. Leaf margins are entire to dentate, and the herbage is variously pubescent to glandular. The 1-3 flowering heads are yellow to somewhat orange. The shape of the involucre is hemispheric, and the pappus is tawny.

A. mollis is common in meadows around lakes and on cool slopes in the Bitterroot Mountains up to timberline. Large plants can be found at lower elevations in many of the deep, Bitterroot canyons. B.C. to CA, east to Alta. and CO.

This species can be distinguished from the similar A. diversifolia by the broad, hemispheric rather than narrow, vase-shaped heads.

9. Arnica longifolia D.C. Eat.

Seep-Spring Arnica

This is a tall, conspicuous plant, with stems from 30-60 cm (12-24 in) tall, even at high elevations. It is densely tufted, with many sterile, leafy stems among the flowering ones, and it often grows in large patches. Fertile stems generally have 5-7 pairs of sessile or short-petiolate leaves that are narrowly lance-shaped in outline. The several to many flowering heads are small compared to those of other Arnica species. The ray flowers are light yellow. The pappus is straw-colored to tawny.

Uncommon in our area, and known only from the southern Bitterroot Range. It occurs at high elevations in habitats with permanently moist soil such as small drainages and rockslides where snow lies late. WA to CA, east to Alta. and CO.

The plants bloom late in the summer, and many of the small buds never develop to maturity.

10. Arnica rydbergii Greene

Rydberg's Arnica

An attractive plant, it is 10-30 cm (4-12 in) tall, usually with 3 pairs of lance-shaped entire-margined, and evidently 3-5 nerved leaves. Although the flowering stems have no leaves at the base, they are clustered with short sterile stems that resemble basal leaves. The 1-3 relatively large flowering heads are bright yellow. The involucre is broadly vase-shaped, and the bracts are woolly. The pappus is white.

This is our smallest Arnica species. It is locally common at or above timberline in habitats that are moist early in the season but dry by later in the summer. This species does not occur in the Bitterroot Mountains, but has been found in extreme southern Ravalli County and in the Rattlesnake Mountains. B.C. to CA, east to Alta., and CO.

Artemisia L. Sagebrush, Sagewort, Wormwood

These are annual, biennial, and perennial herbs and shrubs, mostly aromatic with alternate, entire, or dissected leaves. Flowering heads are small, discoid, and borne in variously shaped inflorescences.

1. Plants obviously shrubby.....(1) A. tridentata
1. Plants herbaceous or occasionally woody at the base.....2
2. Plants biennial or short-lived perennial with a distinct basal rosette from a taproot; odorless or nearly so.....3
2. Plants perennial spreading on rhizomes or clustered on a caudex or taproot, distinct basal rosette absent; plants often odorous.....4
3. Ultimate divisions of leaves lance-shaped and coarsely toothed; plants glabrous.....(10) A. biennis
3. Ultimate divisions of the leaves narrower and entire-margined; plants often pubescent.....(9) A. campestris
4. Basal and lower stem leaves pinnately lobed.....5
4. Basal and lower stem leaves entire, toothed, or with a pair of basal lobes.....10
5. Stems and sterile shoots arising singly from a creeping underground stem (rhizome).....6
5. Stems and sterile shoots arising from caudex or taproot, plants often matted.....8
6. Leaves densely white hairy above.....(2) A. ludoviciana
6. Leaves glabrous and green above.....7
7. Inflorescence with many side branches, weedy plants of low elevations.....(5) A. vulgaris
7. Inflorescence narrow, plants of the mountains.....(6) A. michauxiana
8. Plant mat-forming; ultimate leaf segments small, linear, and numerous.....(7) A. frigida
8. Plants not mat-forming; ultimate leaf segments oblong and wider..9
9. Inflorescence with many side branches; plants of low elevations.....(8) A. absinthium
9. Inflorescence narrow; plants of the mountains.....(6) A. michauxiana

COMPOSITAE

- 10 Leaves glabrous or with sparse long hairs; dry habitats.....(4) A. dracunculus
10. Leaves densely white-hairy beneath; along rivers.....(3) A. lindleyana

Group I. The first group contains true shrubs and has only one species.

1. Artemisia tridentata Nutt.

Big Sagebrush

A heavily aromatic shrub with persistent silvery-gray foliage, sagebrush is usually less than 1.5 m (5 ft) in our area. The principle leaves are 1.5-4.0 cm long and 3-parted at the tip. Flowering heads are borne in an open, feathery inflorescence. From afar, the shrubs appear distinctly flat-topped because of the nearly equal height of the flowering stalks, regardless of the position of the foliage from which they arise. Big sagebrush blooms in late summer.

Sagebrush does not dominate large areas of rangeland in the Bitterroot Valley, but rather its distribution is scattered on both sides of the valley on benchland and in the foothills up to ca. 1370 m (4,500 ft). It also occurs in scattered, small populations at higher elevations. One of the largest of these is below Lolo Peak on the divide between the headwaters of Fall Creek and Meadow Creek at about 2380 m (7,800 ft). Another high elevation stand occurs at about 2160 m (7,100 ft) in southern Ravalli County south of McCart Lookout on the trail to Johnson Peak. Probably the northernmost population in our area occurs on a few small hills in Grass Valley, west of Missoula. All the forms of big sagebrush in our area are referable to ssp. vasseyana (Rydb.) Beetle., called mountain big sagebrush. B.C. to Baja Cal., east to NM and ND.

Big sagebrush and bitterbrush (Purshia tridentata) do not occur together in our area.

Group II. Group two consists of native and introduced, non-tufted herbs with several to many stems and sterile shoots from short and stout or long and creeping rhizomes.

2. Artemisia ludoviciana Nutt.

Gray Sagewort, White Sagewort

The stems, up to 80 cm (3 ft) tall, are from rhizomes that also produce many shorter, sterile shoots. Foliage is white-hairy. Leaves are mostly 1-11 cm long and entire to deeply lobed, the lobes occasionally toothed or lobed. The inflorescence is narrow to somewhat spreading.

There are two varieties in our area. Var. latiloba Nutt. (including forms that are transitional to var. ludoviciana) has long, vigorous rhizomes. The leaves are deeply divided or occasionally entire-margined, densely white-hairy below and grayish or dull green above. It is common in dry meadows in the main valleys. Var. incompta (Nutt.) Cronq. has shorter stems and rhizomes and a more congested growth form. The leaves are smaller and greenish or glabrous above and always lobed or dissected. This variety is locally common on outcrops and rockslides at higher elevations in the mountains. East of the Cascades, B.C. to Mex., east to Ont. IL and AR.

3. Artemisia lindleyana Bess.

Riverbank Sagewort

Stems of riverbank sagewort are 20-50 cm (8-20 in) high, semi-woody below, and clustered from the base, usually from a rhizome, but occasionally from a root crown or taproot. The leaves are narrow, entire to coarsely toothed and green above with dense white hair beneath. Clusters of smaller leaves often occur at the base of the principal leaves. The inflorescence is narrow and unbranched.

This plant, common along the Clark Fork River, is restricted to rock crevices and gravel bars in annually flooded zones along our major rivers. Along the Columbia, Fraser and Yellowstone rivers and their tributaries.

4. Artemisia dracunculus

Green Sagewort, Wild Tarragon

Stems of this species are tall, up to 1.5 m (5 ft) high, from a stout rhizome. The leaves are linear or slightly broader, mostly entire-margined, and green and glabrous (rarely pubescent). The lower leaves wither early in the season. The inflorescence is large and branched with a multitude of small flower heads. The plants are strongly odorous or nearly odorless.

This species occurs occasionally in dry habitats at low elevations throughout our area. A spectacular colony of this plant thrives on the lower slope of Mount Sentinel above the university campus in Missoula. East of the Cascades. Yuk. to Baja Cal., east to the Great Plains; Eurasia.

5. Artemisia vulgaris L.

Wormwood

Stems, 0.5-1.5 m (2-5 ft) tall, arise from simple or branched, stout rhizomes. The principal leaves are wide with several unequal, sharply toothed segments with 1 or 2 pairs of small leaflets near the base. They are green and glabrous above and densely white hairy beneath. The inflorescence is broad and leafy.

"True wormwood" is introduced from Europe and has become a serious weed in the eastern U.S. Rhizomes are often unintentionally shipped with nursery material. Wormwood has not become a serious pest in our area and is known to occur on roadsides and in other open, disturbed areas only in Missoula and near Hamilton.



a. *Arnica fulgens* b. *A. chamissonis* c. *A. mollis* d. *A. longifolia* e. *A. rydbergii*
 f. *Artemisia tridentata* g. *A. ludoviciana* h. *A. lindleyana*

COMPOSITAE

6. Artemisia michauxiana Bess.

Michaux Sagewort

Michaux sagewort has several stems up to 40 cm (16 in) tall from a woody rootstock and a rhizome or occasionally a taproot. The leaves are white-woolly beneath and grassy green above. The lower are up to 5 cm (2 in) long and twice divided, while the upper leaves are smaller and less divided. The bracts subtending the flower heads are nearly glabrous and entire-margined. The inflorescence is long and narrow.

Infrequent in the mountains of southern Ravalli County where it intergrades with A. ludoviciana var. incompta. B.C. to CA, east to Alta., WY and UT. (Not illustrated).

Group III. Included are herbs of compact, tufted, or matted growth form.

7. Artemisia frigida Willd.

Fringed Sagewort

A woody perennial or subshrub with stems up to about 30 cm (12 in) tall and densely clustered on a stout caudex. The leaves are finely dissected and pleasantly fragrant. The whole plant is finely hairy and silvery-gray. The inflorescence is relatively narrow and open. After maturing seed, the stems die back, but the dense foliage of the lower sterile shoots is persistent.

Fringed sagewort has a circumboreal distribution. In our area, it occurs in dry, exposed habitats in the valleys and foothills. High densities often indicate severely overgrazed range. AK to AZ and WI; introduced elsewhere.

This plant is of considerable ornamental value, and selected forms are in the nursery trade.

8. Artemisia absinthium L.

Sageweed

Sageweed is a robust, aromatic perennial with stems up to 1 m (3 ft) tall, from a taproot that often has a woody base. The lower leaves are 2-3 times pinnately lobed and relatively large. The upper leaves are progressively less divided. The leaves are silvery-gray and finely hairy on both surfaces, rarely subglabrous above. The inflorescence is large and branched.

This shrublike plant, with ample basal foliage, is frequently seen on roadsides in the valleys and occasionally as a garden weed. Introduced from Europe, now established across n. U.S. and adjacent Can.

Group IV. The fourth group consists of biennial or short-lived perennial species with taproots and foliage that is odorless or nearly so.

9. Artemisia campestris L.

Prairie Sagewort

A biennial or short-lived perennial, this species develops a conspicuous winter rosette of basal leaves the first year and flowers with a narrow inflorescence on a solitary reddish stem up to 70 cm (2 ft) tall the second or third year. The basal leaves are silky-hairy or rarely glabrous, up to 10 cm (4 in) long, and 2-3 times pinnately divided into narrow segments. Stem leaves are smaller and become entire towards the top.

Var. scouleriana (Bess.) Cronq. occurs sporadically in our area in open, often very dry habitats on benchland, bare foothills, and along the west slopes of the Sapphire Range. Circumboreal, south to OR, AZ, MI, and VT.

10. Artemisia biennis Willd.

Biennial Sagewort

Biennial, often with a reddish stem, this species varies greatly in height, from 30 cm to over 1 m (1-4 ft). The basal rosette, which is formed the first year, consists of dark green and glabrous pinnately divided leaves with lance-shaped, sharply toothed segments. The foliage is nearly odorless. The leafy inflorescence is dense and narrow.

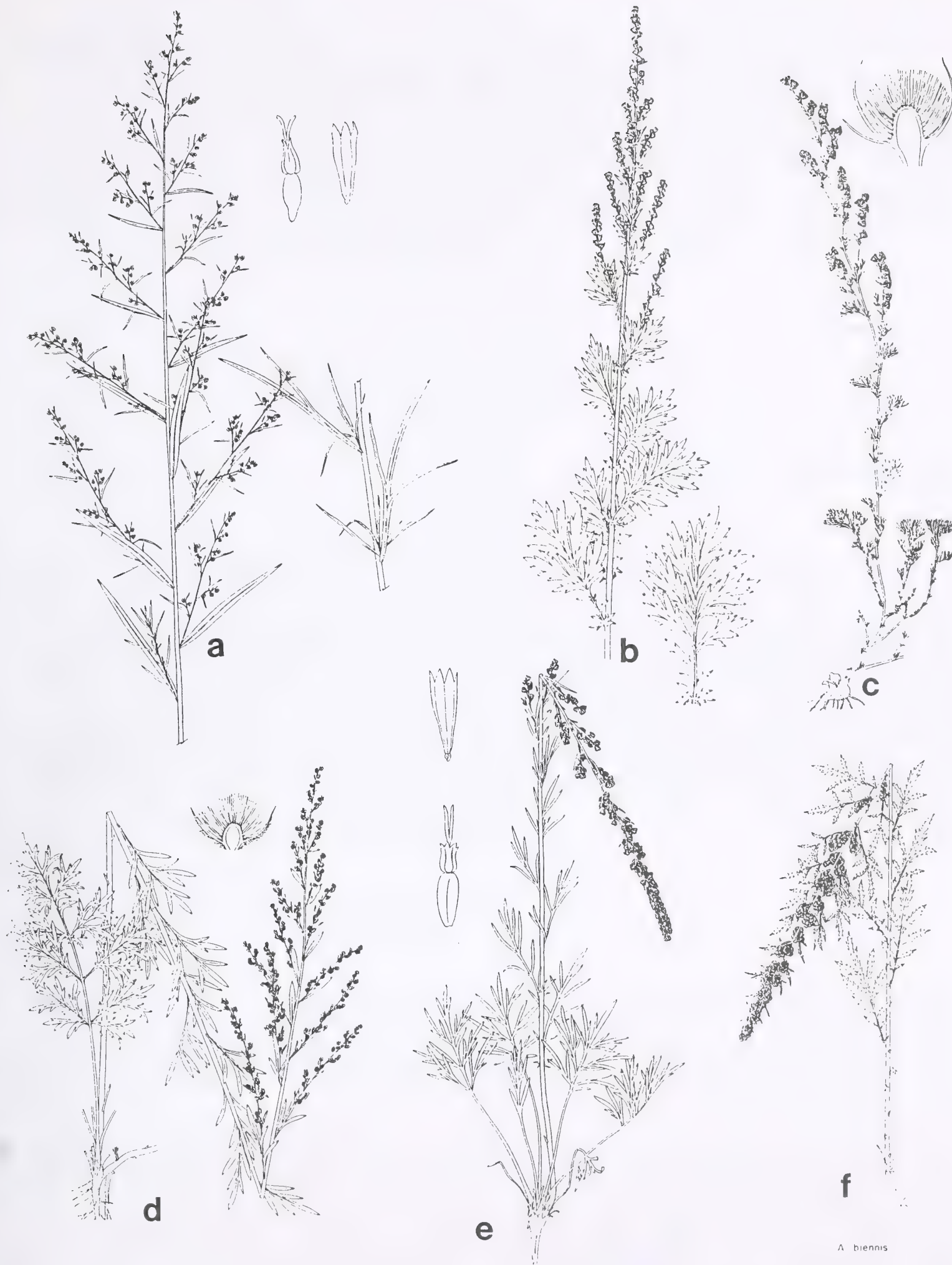
This species requires ample moisture and often occurs on river sandbars and other vernal flooded areas such as ditches and irrigated fields. Native in w. U.S., but widely introduced elsewhere.

Aster L. Aster, Michaelmas Daisy

Our species are perennial herbs with alternate, entire or toothed leaves and solitary to numerous flowering heads. The ray flowers are pistillate (female function only) and various shades of blue, purple and white to pink (never yellow). The disk flowers in the center of the head are yellow or reddish-purple.

The bracts of the involucre occur in many overlapping series like shingles. The pappus is of fine "capillary" bristles. Most of our asters are tall-stemmed, rhizomatous plants with branched inflorescences and many small flowering heads. Two uncommon higher elevation species and some less common forms of more widespread species are low growing, tufted plants bearing only one flower per stem. Our asters generally flower from late summer into fall.

Fleabanes (Erigeron spp.) are often confused with asters. Species of Erigeron generally flower from late spring to mid-summer. With 1 exception, they have fibrous roots or a taproot. The involucre is composed of only 1-2 series of equal bracts, and the rays are narrower and more numerous relative to those of Aster. Asters can be difficult to identify, so information on habitat and rooting habit should always be carefully noted.



a. *Artemisia dracunculus* b. *A. vulgaris* c. *A. frigida* d. *A. absinthium* e. *A. campestris* f. *A. biennis*

COMPOSITAE

1. Leaves essentially strap-shaped, though sometimes tapering to the tip; blades of broadest leaves at least 8 times as long as wide.....2
1. Leaves lance-shaped or broader, not linear; blades of broadest leaves usually less than 6 times as long as wide.....12
2. Stem leaves mostly less than 5 mm wide.....3
2. Stem leaves mostly greater than 5 mm wide.....6
3. Plants with a taproot, flowering heads solitary, leaves mainly basal; plants of timberline and above.....(17) A. alpigenus
3. Plants from a rhizome or branched caudex, heads solitary or several basal leaves soon deciduous; plants subalpine and below.....4
4. Flowering heads solitary on the ends of stems.....(16) A. stenomeres
4. Heads several in a branched inflorescence.....5
5. Stems clustered from a caudex or short rhizome; branches of the inflorescence with many flowering heads.....(6) A. pansus
5. Stems solitary from a creeping rhizome; branches of the inflorescence with 1-3 heads...(5) A. falcatus
6. Ray flowers few, generally 5-8.....(15) A. perelegans
6. Rays more numerous, usually more than 10.....7
7. Involucral bracts glandular.....A. campestris
7. Involucral bracts without glands.....8
8. Pubescence of stems mostly in lines running down from the leaf bases.....9
8. Pubescence of stems more uniform or lacking.....10
9. Outer involucral bracts with a conspicuous papery yellowish or brownish basal portion and membranous margins.....(10) A. subspicatus
9. Outer involucral bracts not as above.....(9) A. hesperius
10. Involucral bracts strongly graduated, the outer ones not more than 1/2 as long as the inner ones.....(2) Aster chilensis
10. Involucral bracts not strongly graduated, the outer ones usually at least 1/2 as long as the inner.....11
11. Outer involucral bracts with a conspicuous yellowish or brownish papery basal portion and membranous margins.....(10) A. subspicatus
11. Outer involucral bracts with a whitish or greenish papery basal portion or none and without conspicuous membranous margin.....(8) A. eatonii
12. Involucre glandular.....13
12. Involucre not glandular.....15
13. Leaves entire or with fine hair on the margin.....(13) A. integrifolius
13. Leaves, or some of them, coarsely or finely toothed.....14
14. Leaves mostly ovate to obovate, sharply and coarsely toothed; montane forests.....(3) A. conspicuus
14. Leaves lance-shaped or narrowly elliptical, entire-margined or with fine teeth; moist areas.....(7) A. modestus
15. Involucral bracts distinctly purple-margined or suffused with purple.....(14) A. sibiricus
15. Involucral bracts without distinct purple margins.....16
16. Foliage with a thin whitish or bluish waxy coating that can be rubbed off (glaucus); upper leaves and lowest involucral bracts clasping the stem; achenes smooth and without hair.....(1) A. laevis
16. Foliage not glaucous; upper leaves and lower involucral bracts usually not strongly clasping; achenes usually hairy.....17
17. Outer involucral bracts with evident membranous margins, the papery basal portion yellowish or brownish; leaves generally toothed.....(10) A. subspicatus
17. Outer involucral bracts without a conspicuous membranous margin, the papery basal portion whitish or greenish; leaves mostly entire.....18
18. Outer involucral bracts usually enlarged and leaf-like.....(11) A. foliaceus
18. Outer involucral bracts not enlarged.....(12) A. occidentalis

Group I. The first group consists of 2 widespread and common species that occur throughout the valleys and the montane zones in a wide variety of habitats including sagebrush grassland, meadows, forest margins, streambanks, and roadsides.

1. Aster laevis L.

Smooth Blue Aster

This tall-stemmed plant, up to 1.0 m (3 ft) high, has fibrous roots from a short rhizome or caudex. The entire to slightly toothed leaves are thick, glabrous and mostly glaucous. The shape of the leaves is variable; the lower leaves are petiolate and soon deciduous, while the upper leaves clasp the stem without a petiole. The inflorescence is open. Rays are pale to medium blue, while the disk flowers are deep yellow, changing to orange-red after autumn frosts. The involucral bracts are narrow and pointed with dark green tips. The pappus is reddish.

Smooth blue aster is common in moderately moist, open or partially shaded habitats from the valleys to the lower subalpine zone. In many habitats this species is an aggressive competitor. Most of the U.S. and Can.

The clasping upper leaves with a bluish green cast, a white, waxy coating that can be rubbed off, and a red midvein are good diagnostic field characters.

2. Aster chilensis Nees

Long-leaved Aster

[A. ascendens Lindl.]

This aster has stems up to 60 cm (2 ft) tall from a rhizome or elongated branching caudex. The leaves are entire-margined, linear to lance-shaped, and sparsely short-hairy. Rays are white to lavender. The bracts of the involucre are green-tipped; the outer are shorter and of different lengths with rounded or blunt tips, while the inner are longer, narrowed toward the base, and have pointed tips.

This species is highly variable. In dry prairie or sagebrush grassland, it will often form low-growing, unbranched plants with just a few flowering heads. In more mesic habitats such as ditch banks in the valley or along logging roads high in the Sapphire Range, plants will be large and highly branched with many flowers. WA to CA, east to Sask. and NM, introduced further east. Our plants are ssp. adscendens (Lindl.) Cronq.

Group II. The second group contains one species, our only aster common in true forest habitats.

3. Aster conspicuus Lindl.

Showy Aster

Showy aster has rigid flowering stems, 30-60 cm (1-2 ft) tall, and usually several much shorter sterile shoots rise from extensive creeping rhizomes. The lower stem leaves are relatively small, short petiolate, and quickly deciduous. The upper leaves are without petioles and elliptical or ovate in outline. The upper 2/3 of the blades are sharply toothed, while the remaining basal portion is entire or nearly so and often reduced abruptly in width, a character most evident on the sterile shoots. The middle stem leaves are the largest, and all leaves are rough to the touch (scabrous). The large, showy flowering heads bloom in late summer and are born in an open, nearly flat-topped inflorescence. The involucral bracts are thin and papery, glandular, and broad at the base, tapering to a pointed, spreading tip. The ray flowers are a bright violet-blue. With increasing shade, it produces a lot of vegetative growth and less flowering stems.

This distinctive aster is most common in the montane zones, especially in partial shade of Douglas fir forests, but it may also be found in forested areas of the valley and lower subalpine zones. East of the Cascades, B.C. to ne. OR, east to Sask. and n. WY.

Group III. This group contains species that occur in dry grassland and shrubland habitats in the valley and lower montane zones.

4. Aster campestris Nutt.

Western Meadow Aster

Stems, 10-50 cm (4-20 in) tall, develop from creeping rhizomes. The leaves are linear or narrowly oblong, firm and entire-margined, and mostly sessile or nearly so. The stem and foliage are glandular above, densely short-hairy below. The inflorescence is narrow with relatively few, small flowering heads. Rays are violet- or purplish-blue. The involucral bracts are glandular with long, green, pointed tips.

A. campestris occurs in grasslands. It is uncommon in moist valley bottoms but is more common in the dry valley and montane zones. B.C. to CA, east to MT and UT.

5. Aster falcatus Lindl.

Little Gray Aster

This plant has stems that are seldom over 50 cm (20 in) tall from a long creeping rhizome. Leaves are firm, linear, and grayish-hairy. Both the stem and leaves are rough to the touch. Branches of the inflorescence are short and straight, with only 1-2 flowering heads toward the tip. The heads are small. Rays are white and 3-8 mm long. The outer involucral bracts are spine-tipped, hairy, and 4-7 mm long.

This aster is scattered in dry, open, low-elevation habitats in the northern part of our area. Northwest Great Plains west to AK and south in the mountains to NM and AZ.

The species is very similar to A. pansus; however, A. falcatus has creeping rhizomes, stems that arise singly and grow upward, and branches with few and somewhat larger heads than A. pansus which has clustered, outward-spreading stems arising from short rootstocks and branches with numerous heads.

COMPOSITAE

6. Aster pansus (Blake) Cronq.

Heath-leaved Aster

Similar to the previous species, heart-leaved aster has stems that are 30 cm to over 1 m (1-3 ft) tall and clustered from a short rhizome or caudex. The branches of the open inflorescence are long and recurved-ascending with numerous, tiny flowering heads.

A. pansus is scattered in dry, open, low-elevation habitats in the northern part of our area. This species occurs in moist saline or alkaline soils in eastern Montana and theoretically could also be found in similar habitats in our area. B.C. and e. WA to UT, east to the nw. Great Plains.

Group IV. Species in the fourth group occur in moist to wet habitats in the valley and montane zones.

7. Aster modestus Lindl.

Few-flowered Aster

This species has stems that are 30-80 cm (12-32 in) tall from creeping rhizomes. The large, thin leaves are lance-shaped, entire or weakly toothed, and sharp-pointed. They are without petioles and clasp the stem; the lower ones are smaller and soon deciduous. The relatively few flowering heads are born in an open, leafy, nearly flat-topped inflorescence. Ray flowers are deep purple or violet. The involucre is glandular; the narrow bracts are pointed and all of approximately the same length. The outer bracts are green, while the inner are purplish.

This aster is common in permanently wet areas such as creek banks, around sloughs and river channels, and willow and alder thickets throughout our area. AK to OR, east to ID, MN, and Ont.

The plant resembles the often cultivated New England asters (A. novae-angliae) but is distinctly different from all other native asters in our area.

8. Aster eatonii (Gray) Howell

Eaton's Aster

Stems, 30-80 cm (12-32 in) tall, arise from creeping rhizomes. The leaves are strap-shaped, entire-margined, and pointed at the tip. The lower ones are short petiolate and soon deciduous, while the upper ones are without petioles, 5-15 cm (2-6 in) long, and 7-13 times as long as wide. Stems are often slightly pink. The inflorescence is elongated and short-branched with numerous flower heads. The ray flowers are pink to lavender and 5-12 mm long. The involucral bracts are thin and leafy with spreading or recurved tips.

Eaton's aster has been found along the banks of Lost Horse, Bass, Lolo and Rattlesnake creeks. B.C. to CA, east to Sask. and NM.

9. Aster hesperius Gray

Marsh Aster

The long stems, up to 1.5 m (5 ft), arise from creeping rhizomes. Leaves are linear to broadly lance-shaped and entire-margined or rarely toothed. They are sessile, or the lower are petiolate and soon deciduous. The stem is pubescent with lines of short white hairs running down from the leaf bases. The inflorescence is leafy and spreading with long branches and numerous flowering heads. Rays are whitish to pinkish lavender or purplish blue. The involucral bracts are whitish below, green and pointed above.

Known from wet meadows along the Bitterroot River between Lolo and Hamilton. Alta. to CA, east to NM and n. Great Plains.

A. hesperius resembles both A. eatonii and A. chilensis and is best distinguished by the lines of pubescence on the stem that are easily visible under 10X magnification.

10. Aster subspicatus Nees

Douglas' Aster

This species is similar to A. foliaceus and may occasionally resemble A. eatonii or A. laevis. The leaves are often toothed and are narrower than in A. foliaceus. The thick involucral bracts are narrow to broad with an evident straw-colored or brownish lower portion and ascending or recurved tip. The pappus is reddish at maturity.

Douglas' aster has been found only below the high water mark along the Clark Fork River near Missoula and along the Blackfoot River near Bonner. It often flowers into late October. AK to CA, east to Alta. and MT

Group V. This group contains species that occur in moist habitats in the mountains, generally montane and subalpine meadows. Both species in this group and Erigeron peregrinus are similar in appearance, flower at the same times, and often occur in the same habitat. Features of the involucral bracts are the best distinguishing characters. E. peregrinus has one series of narrow bracts, equal in length; A. occidentalis has 2-many series of narrow bracts of unequal length; A. foliaceus has wide and leaf-like outer bracts.

11. Aster foliaceus Lindl.

Leafy Aster

The flowering stems, which arise from a rhizome or caudex, vary greatly in length. The leaves are entire or shallowly and irregularly toothed. The lower ones, which are soon deciduous, are oblong lance-to egg-shaped in outline and petiolate. The upper leaves are similar but not oblong. Flowering heads are



a. *Aster chilensis* b. *A. laevis* c. *A. conspicuus* d. *A. campestris* e. *A. falcatus* f. *A. pansus*
 g. *Aster eatonii* h. *A. modestus* i. *A. hesperius*

COMPOSITAE

solitary or few in an open cluster. The ray flowers are 1-2 cm (ca. 1/2 in) long and rose purple to blue or violet. The outer involucre bracts are green and leaflike, often grading into the small leaves of the upper stem.

Plants of this species in our area can be placed in 4 varieties. Var. parryi (D.C. Eat.) Gray and var. lyallii (Gray) Cronq. intergrade. Both are 25-50 cm (10-20 in) tall with 1-few heads per stem. These varieties are common in the montane and subalpine zones on the west side of our area. Var. apricus Gray is usually less than 15 cm (6 in) tall with lax or ascending stems. The involucre bracts have purple tips and margins. This variety occurs near or above timberline. It is uncommon or rare in the Bitterroot Range, but becomes more common just south of our area. Var. cusickii (Gray) Cronq. has stems, 40-80 cm (16-32 in) tall, with strongly clasping upper stem leaves. The involucre bracts are lance- to egg-shaped with obtuse or acute tips. It occurs in moist meadows and open subalpine forests at Skookum Butte and along the Granite Lake Trail, west of Missoula. AK to CA, east to MT and NM.

12. Aster occidentalis (Nutt.) T. & G.

Western Mountain Aster

Similar in most respects to the previous species, flowering plants are not greater than 50 cm (20 in) tall with stems that are unbranched below the inflorescence arising from a rhizome or caudex. Leaves are entire-margined and, on the average, slightly smaller than those of A. foliaceus. The flowering heads are few in an open cluster. Ray flowers are shades of blue or purple. The involucre bracts are pointed to blunt-tipped and linear to oblong. They are green throughout except for a minute purple tip.

Var. occidentalis, as described above, occurs in moist meadows in the subalpine and timberline zones. Var. intermedius Gray generally occurs at lower elevations and has a wider and more leafy inflorescence. Western Can. south to CA and CO.

Group VI. The sixth group of asters occurs in the montane and subalpine zones in habitats that are relatively dry, at least during the latter half of the growing season.

13. Aster integrifolius Nutt.

Thickstem Aster

This is a sturdy plant, 20-40 cm (8-16 in) tall, with fibrous roots from a short rhizome or caudex. The herbage is densely glandular and often short-hairy above. The coarse and often abundant basal and lower stem leaves are oblong lance- to egg-shaped with short petioles. The clasping upper stem leaves are narrowly egg-shaped and without petioles. They become smaller toward the top. Flowering heads are large and few in a short-branched inflorescence. The ray flowers are deep violet-purple and 10-15 mm long. The involucre is 8-14 mm high and glandular. Outer bracts are leafy, while the inner ones are narrower and purplish.

This is the most common aster in the group. It has a broad ecological amplitude, often growing in moist, well-drained soil of mountain slopes. East of the Cascades, WA to CA east to MT and CO.

The combination of habitat, large basal leaves greatly reduced upwards, and glandular involucre make this an easily distinguishable species.

14. Aster sibiricus L.

Arctic Aster

[A. meritus A. Nels.]

In our area this species occurs as a robust, low-elevation form with flowering stems, 20-40 cm (8-16 in) tall, arising from rhizomes. Leaves are firm, lance-shaped to elliptical in outline, short-hairy, and entire-margined to variously toothed. The veins are conspicuous. The lowest leaves are usually much smaller than those above. Flowering heads are few to several in a compact and showy inflorescence. The ray flowers are purplish-blue. The involucre bracts are in several series and are somewhat spreading and often recurved at the tip. They are green above, and often have a purple margin.

Arctic aster occurs in open, sandy, or rocky habitats in the mountains on both sides of the Bitterroot Valley. In the Bitterroot Range, it is known only from above Peterson Lake at 2130 m (7,000 ft) and two locations near Lolo Hot Springs. Our plants are var. meritus (A. Nels) Raup. Circumboreal, south to WA, ID, and WY.

This species resembles A. conspicuus but can be distinguished by its eglandular involucre.

15. Aster perelegans Nels. & Macbr.

Elegant Aster

This species has several erect stems, 30-60 cm (1-2 ft) tall, clustered on a fibrous-rooted caudex. The leaves are firm, rough to the touch, and linear to narrowly elliptical in outline. They are entire-margined and without petioles. The lower ones are small and soon deciduous. Flowering heads are few to many in an open, umbrellalike inflorescence. Each flower stalk (peduncle) is beset with many small, leaflike bracts below the involucre. Ray flowers are deep violet-blue. The bracts of the involucre are in several series and are straw-colored with a pointed green tip.

The plant is uncommon in our area. It occurs on dry slopes in open pine forests in the montane and lower subalpine zones. Elegant aster has been collected at School Point and above Como Lake, at elevations of 1800 m (5,900 ft) in the southern Bitterroot Range and in the Anaconda-Pintler Wilderness above Orphan Creek at 2130 m (7,000 ft). A Northern Great Basin species, OR to NV, east to UT and southwest MT.

16. Aster stenomerus Gray

Northwest Aster

Northwest aster is a tufted perennial with a woody crown and fibrous roots. The few to several erect stems are 20-30 cm (8-12 in) tall and bear a single, large flowering head. The stems have many linear, 1-nerved leaves that lack a petiole. The rays are violet-blue. The glandular-hairy bracts of the involucre are pointed and overlapping.

This species occurs on grassy summits and ridge crests in the southern Bitterroot Range, including Bare Cone Peak (2440 m, 8,000 ft), Saddle Mountain (2370 m, 7,780 ft), and near Castle Rock (2130 m, 7,000 ft). Eastern WA and se. B.C., south to central ID and adjacent MT.

The solitary heads and crowded linear leaves distinguish northwest aster from all others in our area. A. scopulorum, the only similar species in the Northern Rockies occurs to the south and east of us.

Group VII. This last group contains one species that occurs in open habitats in the timberline and alpine zones.

17. Aster alpigenus (T. & G.) Gray

Alpine Aster

This is a dwarf plant with a taproot and a simple or few-branched caudex. The stems are 4-10 cm (1-4 in) tall with a few, small, narrow leaves and a solitary flowering head. The basal leaves are persistent, nearly linear, unequal in length, and entire-margined. Rays are 7-15 mm long and deep violet. The involucre bracts are overlapping and often purplish toward the tip.

The species is common on Trapper Peak at 2800-3050 m (9,200-10,000 ft) and on West Pintler Peak in the extreme southeast corner of Ravalli County. Plants in our area are var. Haydenii (Porter) Cronq. WA to CA, east to MT, WY and NV.

Balsamorhiza Nutt. BalsamrootBalsamorhiza sagittata (Pursh) Nutt.

Arrowleaf Balsamroot

This is a perennial herb with a massive branched taproot and 1-many flowering stems to 50 cm (20 in) tall. The leaves are mostly basal and long-petiolate, with broadly arrow- or heart-shaped blades up to 30 cm (1 ft) long. They are silvery-gray with dense short hairs. The stems, which often have 1-2 small lance-shaped leaves, branch to form 1-several flower stalks, each bearing a single, large, flower head. Rays are deep yellow and 2.5-4 cm (1-2 in) long. The involucre is white-woolly on the lower part. The pappus is lacking.

Balsamroot is a widespread, showy, and well-known species, commonly occurring on open or lightly forested, dry slopes and flats in the valley and montane zones. B.C. to CA, east to Alta., SD, and CO.

The strikingly bright colors of this species with blue lupines, purple larkspur and scarlet paintbrush gild the grasslands throughout our area.

Bellis L. DaisyBellis perennis L.

English Daisy

English daisy is a dwarf perennial, 5-15 cm (2-6 in) high, from a short, fibrous-rooted caudex. Leaves are mainly basal; the blades are elliptical to nearly round in outline and minutely toothed with a petiole equal in length to the blade. The flowering heads are solitary, and the involucre is hemispheric. The numerous ray flowers are white, while the disk flowers are yellow.

This European introduction occurs sporadically as a weed in Missoula area lawns. Once established, it persists for many years. Established throughout n. U.S. and parts of s. Can.

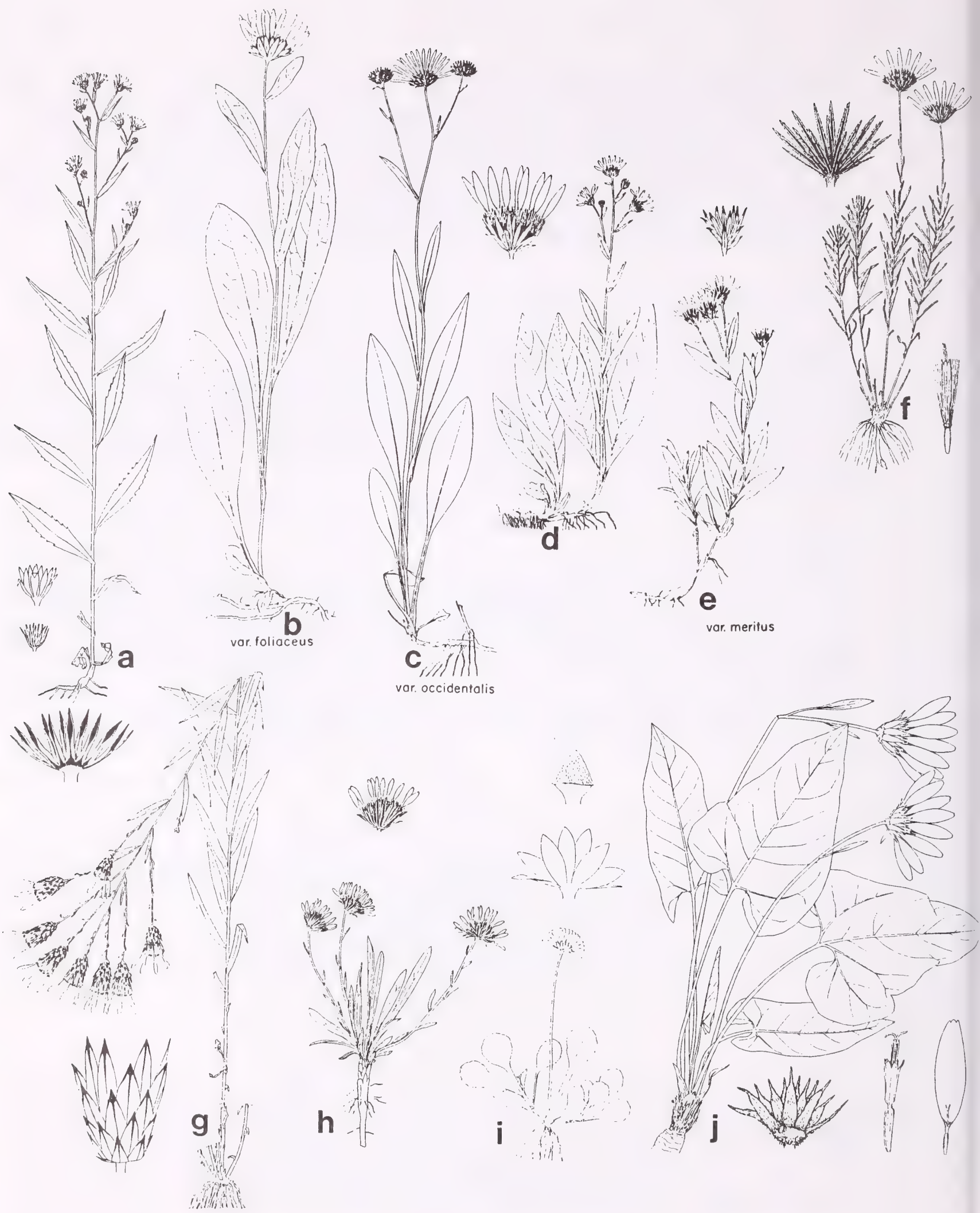
English daisy is intentionally planted in European lawns, and its presence in lawns here gives them a certain "Old World charm."

Bidens L. Beggar-ticksBidens cernua L.

Beggar-ticks

This is an annual, 5-100 cm (2-40 in) tall, with stems that are simple or branched above in larger plants. Leaves are sessile, narrowly to broadly lance-shaped, and usually toothed on the margin. The flowering heads are hemispheric or nearly so. The outer involucre bracts are green, narrowly lance-shaped, and spreading. Rays are yellow or sometimes lacking. The heads become nodding with age.

Common in wet habitats in the valley zone, beggar-ticks grows large in ponds and ditches without seasonal water level fluctuations, but is dwarfed in vernal moist sites such as drying, muddy shores. Widespread in temperate regions of the Northern Hemisphere.



a. *Aster subspicatus* b. *A. foliaceus* c. *A. occidentalis* d. *A. integrifolius* e. *A. sibiricus*
 f. *A. stenomerus* g. *A. perelegans* h. *A. alpinus* i. *Bellis perennis* j. *Balsamorhiza sagittata*

Brickellia Ell. Brickellia, BrickellbushBrickellia grandiflora (Hook.) Nutt.

Tasselflower

The herbaceous perennial arises from thick, tuberlike roots. The 1-several stems are up to 60 cm (2 ft) tall. The leaves are petiolate and mostly alternate. Blades are toothed on the margin and triangular or arrow-shaped in outline with a slender, entire-margined tip. The discoid flowering heads are solitary or in small groups at the ends of branches of a short and broad, somewhat flat-topped inflorescence. The disk flowers are cream to slightly purplish. Involucral bracts are green-striped; the inner have a translucent margin, while the outer are shorter with a soft slender appendage at the tip.

This plant occurs in dry, open habitats such as rockslides or steep, gravelly or sandy slopes. It is scattered in small colonies in the montane and subalpine zones in both the Bitterroot and Sapphire mountains. This species may not be as uncommon as our few collections indicate. WA to Baja Cal., east to NE, AR, and NM.

Carduus L. ThistleCarduus nutans L.

Musk Thistle, Nodding Thistle

This species is a biennial with a strong, simple or sparingly branched stem up to 2 m (7 ft) tall. Stems are winged, the wings beset with spines. The leaves are deeply lobed to pinnately divided. The lobes are tipped with a strong spine, and smaller spines are distributed along the margins. The large, mostly nodding, discoid heads are solitary at the ends of branches. The broad involucral bracts are spine-tipped and spreading or reflexed. Disk flowers are purple.

This introduced plant has become our most common, large-flowered, weedy thistle. It occurs frequently along roads, particularly logging roads, and in other disturbed areas up to 1830 m (6,000 ft). Widely established in North America.

Centaurea L. Knapweed, Star-thistle, Cornflower

Species in this genus are annual, biennial, or perennial herbs with branched stems. Herbage is often densely white-hairy when young but becomes glabrous with age. The leaves are alternate. Flowering heads terminate the branches of open, leafy inflorescences. The heads are discoid, but the marginal flowers are often sterile with an enlarged corolla that resembles a ray flower. Flowers are white to various shades of blue and purple. The involucral bracts overlap in several series and have an appendage or spine at the tip. Our species are all introduced from Europe or Asia. Only C. maculosa has become a serious weed in our area.

1. Marginal flowers enlarged and resembling ray flowers.....2
1. Marginal flowers similar to those in the center of the head, not enlarged.....4
2. Lower leaves deeply pinnately divided into many linear segments, very common.....(1) C. maculosa
2. Lower leaves lobed or toothed, not divided into many segments, uncommon.....3
3. Leaves linear or nearly so, less than 1 cm wide, annual.....(2) C. cyanus
3. Leaves, at least lower ones, greater than 1 cm wide, perennial.....(5) C. pratensis
4. Flowers purple.....(4) C. repens
4. Flowers yellow or cream, sometimes purplish tinged.....5
5. Flowers yellow, involucral bract tipped by a long spine.....(6) C. solstitialis
5. Flowers cream or sometimes purplish, bracts without a long spine.....(3) C. diffusa

1. Centaurea maculosa Lam.

Spotted Knapweed

This is a short-lived perennial, usually from a taproot. Stems are 30-100 cm (1-3 ft) tall, and the lower leaves are pinnately divided into narrow lobes. The upper stem leaves are smaller and entire-margined. Flowers are pinkish purple; the marginal ones are enlarged and resemble rays. The involucral bracts have black stripes and dark tips; the outer ones have comblike appendages along the upper margin.

This plant is abundant in open habitats, especially disturbed areas, in the valley and montane zones. Widespread throughout most of U.S. and S. Can.

Spotted knapweed is perhaps the most serious noxious weed in our area. Introduced into Ravalli County during the second decade of this century, allegedly with grain from Russia, this species has spread through the western half of Montana and adjacent states. It dominates large expanses of rangeland, turning the plains and hills purple when it flowers from July into September.

2. Centaurea cyanus L.

Cornflower, Bachelor's Buttons

An annual or winter-annual, this species has stems 20-100 cm (8-40 in) tall and narrow leaves, entire or the lower ones with a few narrow lobes. Flowers are usually blue, but may be various shades of white, pink or purple. The marginal disk flowers are enlarged.

COMPOSITAE

Rare on roadsides or in waste areas. Cosmopolitan.

This is a popular garden flower. Most of our collections probably represent garden escapes rather than introductions from agricultural areas.

3. Centaurea diffusa Lam.

Diffuse Knapweed, Tumble Knapweed

This is a highly branched annual or biennial 10-60 cm (4-24 in) tall. It resembles C. maculosa, but the pinnately lobed leaves are smaller, the lower soon deciduous. The numerous flowering heads are smaller and often cream-colored. Outer flowers are not enlarged. The outer and middle involucre bracts are tipped with a slender spine.

A few small colonies of this plant have been found along the highways west of Missoula. Native of the Mediterranean region, established across much of U.S.

4. Centaurea repens L.

Russian Knapweed

Russian knapweed is a profusely branched perennial, 40-80 cm (16-32 in) tall, from deep-seated, creeping, black roots. The leaves are small; the lower are up to 15 cm (6 in) long and few-lobed, while the upper are mostly entire. Flowering heads are broad at the base. The flowers are purple, and the marginal ones are not enlarged. The involucre bracts are green to straw-colored, the broad, outer ones striped and rounded above, the inner ones narrow and tapering to a fine point.

This species is rare in our area. It has been collected west of Missoula. Russian knapweed is a serious noxious weed in many areas of the western U.S., where it occurs mostly in alkaline, seasonally wet habitats.

5. Centaurea pratensis L.

Meadow Knapweed

This is a perennial with toothed or shallowly lobed lower leaves and mostly entire upper leaves. Flowers are pinkish-purple, the marginal ones enlarged as in C. maculosa. The tips of the involucre bracts are dark brown and irregularly cleft along the margins.

The plant was collected once along the lower Bass Creek Trail not far above Charles Waters Memorial Campground.

C. pratensis is intermediate between C. jacea and C. nigra. Presumably it is a hybrid between the two.

6. Centaurea solstitialis L.

Yellow Star-thistle

This annual or biennial species has stems, 20-80 cm (8-32 in) tall, with wings going down the stem from the leaf bases. The lower leaves are pinnately divided, becoming linear and entire-margined upward. Flowers are yellow, the marginal ones not enlarged. The involucre bracts are tipped by long, spreading spines.

Yellow star-thistle has been collected once in Ravalli County. WA to CA and east to much of U.S.

Chaenactis DC. Chaenactis, Dusty Maiden

Our species are biennial or perennial herbs from a taproot. Leaves are pinnately dissected. The flowering heads are discoid. Flowers are white to pink or rose. Involucre bracts are narrow, green, and mostly in one equal series. This genus is endemic to the western U.S.

1. Leaves all basal, flowering stems naked; plants from timberline or above.....(2) C. alpina

1. Flowering stem with leaves, plants of valley and montane zones.....(1) C. douglasii

1. Chaenactis douglasii (Hook.) H. & A.

Douglas' Dusty Maiden

Douglas' dusty maiden is a biennial or short-lived perennial. The 1-few stems are erect, and stem and foliage are densely grayish long-hairy. The leaves are twice divided, the ultimate small segments are curled. Flower heads are borne in an open, flat-topped inflorescence in which the outer branches are occasionally taller than the inner. The involucre bracts are glandular. Flowers are cream to occasionally pinkish.

This plant is common in open, rocky habitats, such as road cuts, rockslides and outcrops throughout our area in the valley and montane zones. Ours plants are var. achilleaefolia (H. & A.) A. Nels. B.C. to CA, east to MT, CO, and AZ.

2. Chaenactis alpina (Gray) Jones

Alpine Dusty Maiden

Similar in appearance to C. douglasii, but plants are smaller and perennial from a taproot and branched root crown. The stems are leafy at the base and naked above. Flowering heads are solitary. The flowers are pale flesh-pink to bright rose colored.

Alpine dusty maiden occurs in dry, rocky, open habitats in the timberline and alpine zones. In our area it has been collected only once in the Bitterroot Mountains, from near the crest of East Boulder Peak at an elevation of 2820 m (9,250 ft). OR to UT, east to MT and CO.



a. *Bidens cernua* b. *Brickellia grandiflora* c. *Carduus nutans* d. *Centaurea maculosa* e. *C. cyanus*
 f. *Centaurea diffusa* g. *C. repens* h. *C. solstitialis*

COMPOSITAE

Chrysanthemum L. Daisy

Chrysanthemum leucanthemum L.

Oxeye Daisy

Oxeye daisy is a perennial generally from a well-developed rhizome. Stems are usually unbranched and up to 80 cm (32 in) tall. The basal leaves are broadly or narrowly spoon-shaped, with rounded teeth or lobes on the margin. Stem leaves are smaller and of variable shape, the upper ones without petioles. The large flowering heads are radiate and solitary. The center of yellow disk flowers is up to 2 cm wide. Ray flowers are pure white.

This species is common in moist to dry, open habitats, mostly below 1520 m (5,000 ft) throughout our area. Introduced from Eurasia, naturalized throughout most of temperate North America.

Oxeye daisy is such a popular flower that most people refuse to think of it as an exotic weed.

Chrysopsis (Nutt.) Ell. Golden Aster

Chrysopsis villosa (Pursh) Nutt.

Hairy Golden Aster

[Heterotheca villosa (Pursh) Shin.]

Plants are low-growing perennials from a taproot that often has a woody base. The spreading stems are usually clustered and 10-30 cm (4-12 in) tall. Herbage is hairy and mostly glandular. The alternate leaves are evenly distributed on the stem and little reduced upward. They are sessile or with short petioles, strap-shaped and entire-margined. The radiate flowering heads are borne in a short, open inflorescence. The narrow involucral bracts overlap each other in several series. Both the disk and ray flowers are bright yellow. The rays are 6-10 mm long.

Common throughout our area in sandier soils of open habitats in the valley and montane zones. B.C. to CA, east to Sask., IL, and TX.

Hairy golden aster blooms from mid-summer to late fall.

Chrysothamnus Nutt. Rabbit-brush

Our species are shrubs with alternate, sessile, entire and linear leaves. The discoid flowering heads are elongated and numerous in open or compact inflorescences. The involucral bracts are narrow and overlapping in about five series. The flowers are yellow and bloom in late summer or fall.

G. L. Winkler and central L. Wambolt provided information on the varieties of C. nauseosus.

1. Stems densely covered with white hair, leaves not spirally twisted.....(1) C. nauseosus
1. Stems glabrous or sparsely hairy, leaves spirally twisted.....(2) C. viscidiflorus

1. Chrysothamnus nauseosus (Pall.) Britt.

Rubber Rabbit-brush, Gray Rabbit-brush

A shrub up to 1.5 m (5 ft) tall with young twigs that are covered with a felt-like hairiness. The linear leaves are also often densely gray-hairy. The flowering heads are borne in flat-topped to rounded inflorescence.

Rubber rabbit-brush is common in grasslands, shrublands and other dry, open habitats in the valleys and foothills throughout our area. Almost all of our plants belong to var. albicaulis (Nutt.) Rydb., woody shrubs to 2 m (6 ft) tall with more-or-less finely woolly involucral bracts and leaves and twigs covered with dense, persistent, light gray or nearly white hairs. The var. atratus (A. Nels.) Cronq. of ssp. consimilis (Greene) Hall & Clem., with glabrous involucral bracts, narrow, elongated inflorescences and leaves 0.5-1.0 mm wide was collected in alkaline soil in Ravalli County. Var. nauseosus, a small plant, 10-60 cm (4-24 in) tall and woody only at the base, was collected south of Darby. B.C. to CA, east to Sask., TX, and n. Mex.

Rubber rabbitbrush increases with overgrazing but is easily destroyed by fire.

2. Chrysothamnus viscidiflorus (Hook.) Nutt.

Green Rabbit-brush

This shrub is usually less than 1 m (3 ft) tall. The twigs are whitish, glabrous or finely short-hairy. The linear leaves are green, minutely glandular hairy, and often spirally twisted. The flowering heads are borne in an open rounded inflorescence.

Our plants are var. lanceolatus (Nutt.) Greene. This species is common on the west slopes of the Sapphire Range in open, dry habitats in the valley and montane zones. East of the Cascades, B.C. to CA, east to ND and NM.

Green rabbitbrush also increases with overgrazing.

Cichorium L. Chicory

Cichorium intybus L.

Chicory

A herbaceous perennial, with single stems, 30-150 cm (1-5 ft) tall, arising from a long, tough, deep taproot. The stems are branched and leafy. The lower leaves are petiolate, lance-shaped, and pinnately

lobed or toothed. They are 8-25 cm (3-10 in) long and 1-7 cm (1-3 in) wide. Upper leaves are smaller, entire-margined, and without petioles. The roots and herbage exude an acrid, milky juice upon injury. There are 1-3 flowering heads, composed entirely of ray flowers, at the base of leaves and branches in the upper part of the plant. The flowers are sky blue and up to 2 cm long.

Originally from the Mediterranean region, this cosmopolitan weed is uncommon in waste places in our area. It occurs on the old railroad embankment north of Florence and along Highway. 93 in Ravalli County.

On sunny days, the flowers close by mid-day, and they never open in rainy weather. The roots of this plant were a popular substitute for coffee in Europe.

Cirsium Mill. Thistle

Species in this genus are biennial or perennial, spiny herbs from a taproot or deep-seated rhizome. Leaves are alternate and pinnately lobed or toothed. The flowering heads contain only disk flowers. Flowers are white to purple. The involucre bracts are usually overlapping in several series; some are usually spine-tipped.

- | | | |
|----|---|---------------------------|
| 1. | Involucre of largest flowering heads less than 2.5 cm (1 in) high; plants rhizomatous... | (1) <u>C. arvense</u> |
| 1. | Involucre of largest flowering heads greater than 2.5 cm high; plants from a taproot..... | 2 |
| 2. | Flowering heads mostly without stalks (sessile) in terminal clusters..... | 3 |
| 2. | Flowering heads not sessile, borne in more open inflorescences..... | 4 |
| 3. | Plants densely white-hairy on the stem and lower leaf surface..... | (3) <u>C. undulatum</u> |
| 3. | Plants without dense white hairs, foliage green..... | (2) <u>C. vulgare</u> |
| 4. | Involucre bracts tapered to a point..... | (4) <u>C. hookerianum</u> |
| 4. | Inner involucre bracts dilated to a fringed appendage at the tip..... | (5) <u>C. scariosum</u> |

Group I. The first group contains introduced, weedy species, common in disturbed habitats. These are the only members of this genus occurring in residential and agricultural areas.

1. Cirsium arvense (L.) Scop.

Canada Thistle

A perennial from deep-seated, creeping rhizomes. The stems are 30-150 cm (1-5 ft) tall and highly branched above. Leaves are mostly glabrous or green above and usually densely white-hairy beneath. Several to many heads are borne in an open inflorescence. Plants are unisexual (dioecious). The flowers are pink-purple and 1-2 cm high.

Canada thistle is common in open, moist, disturbed habitats throughout our area in the valley zone. Native of Eurasia, introduced in n. U.S. and adjacent Can.

Canada thistle is easily distinguished from all other true thistles by the rhizomatous habit and relatively small and more numerous flowering heads. This is the only species in our area that has become a serious problem for farmers and gardeners. It prefers rich, moist soil but can grow in flooded and alkaline soils as well. Plowing or rototilling only cuts the rhizomes and further spreads the plant.

2. Cirsium vulgare (Savi) Tenore

Bull Thistle

This is a biennial with spiny stems 30-150 cm (1-5 ft) tall from a stout, sometimes branched taproot. The leaves are pinnately lobed, and each lobe is tipped by a long spine. Both leaf surfaces are covered with smaller spines. The large purple-flowered heads are borne in a few-flowered, open inflorescence. The involucre bracts are spine-tipped and 2.5-4 cm (1-2 in) long.

Common in pastures, roadsides, and other disturbed habitats in the valley and montane zones throughout our area. Native of Eurasia, widely established throughout North America.

The flowers are a favorite of bees and butterflies.

Group II. The second group contains the only native species that occurs mainly in the valley and lower montane zones.

3. Cirsium undulatum (Nutt.) Spreng.

Wavy-leaf Thistle

Wavy-leaf thistle is a short-lived perennial from a branched taproot. Stems are 30-100 cm (1-3 ft) tall, branched, and densely and persistently white-hairy. The coarsely-toothed or pinnately divided leaves are also white-hairy, more pronounced below than above. The pale pink flowering heads are borne in a few-to several-flowered, open inflorescence. The outer involucre bracts are 25-40 mm (1-2 in) long with a dark, glandular ridge on the back that ends in a spine. The inner bracts have only a papery tip.

This species is common in well-drained soil of grasslands at lower elevations throughout our area. East of the Cascades, B.C. to OR, east to AZ and the Great Plains.

The grayish green leaves and whitish stem distinguish C. undulatum from all other species in our area. The similar C. floodmanii is common east of the Continental Divide but is not known here.



a. *Chaenactis alpina* b. *C. douglasii* c. *Chrysanthemum leucanthemum* d. *Chrysopsis villosa*
e. *Chrysothamnus nauseosus* f. *C. viscidiflorus* g. *Cichorium intybus* h. *Cirsium arvense* i. *C. vulgare*

Group III. The third group has two species usually found in moist meadows in the montane to timberline zones. The species are similar in appearance and intergrade in the Bitterroot Mountains.

4. Cirsium hookerianum Nutt.

White Thistle, Elk Thistle

This plant is a short-lived perennial or biennial from a taproot. The succulent stems are erect, 30-150 cm (1-5 ft) tall, and sparsely to densely hairy. The leaves are strap-shaped and coarsely toothed or lobed. They are sparsely hairy above and sparsely to densely white-hairy beneath with spines at the tip of the teeth or lobes. The stem tapers gradually toward the top. The sessile flowering heads are mostly clustered below the larger terminal one; however, they may be irregularly distributed along the upper third of the stem. The involucre bracts are narrow and sparsely long-hairy and do not overlap. The outer bracts taper to a short spine, while the inner are unarmed and often twisted. Flowers are creamy white, rarely pink.

This tall thistle is common in meadows in the montane and lower subalpine zones throughout our area. Though it is more common at lower elevations, it has been collected at 2590 m (8,500 ft) in the southern Bitterroot Mountains. East of the Cascades, B.C. to WA, east to Alta. and MT

Stems of ungrazed plants are unbranched; however, as frequently happens, these highly palatable plants branch profusely when bitten off by livestock or wildlife.

5. Cirsium scariosum Nutt.

Elk Thistle

A biennial or short-lived perennial, 20 to over 100 cm (8-40 in) tall, from a stout taproot. The succulent stems taper very little toward the top. The leaves are strap-shaped and coarsely toothed or lobed with spines at the tips of the lobes. Stems and leaves tend to be covered with dense, long, tangled white hairs, especially in the inflorescence. The large flowering heads are sessile and clustered at the top of the stem, the top head the largest. The involucre bracts are broad and overlapping. The outer have a short, erect spine tip, while the inner are unarmed with an expanded, fringed tip. Flowers are mostly pale pink, occasionally creamy white or reddish purple.

Elk thistle is locally common in moist meadows from the montane zone to timberline throughout our area. East of the Cascades, Yuk. to CA, east to Sask., CO, and AZ.

C. scariosum can be distinguished from C. hookerianum by its more succulent stem, more closely spaced and longer leaves, and denser covering of hairs. At high elevations, C. scariosum can be almost stemless. In these plants, the large flowering heads are in the center of the rosette of long, white-hairy leaves. In the Lolo Creek Valley from Lee Creek Campground southwest along Highway 12 to Packers Meadows at the Idaho State Line, there is an elk thistle with red-purple flowers, a partially reddish stem, and red-veined upper leaves. The taxonomic identity of these plants is unknown.

Conyza Less. Horseweed

Conyza canadensis (L.) Cronq.

Horseweed, Canada Fleabane

Horseweed is an annual with leafy stems up to 1 m (3 ft) tall. The lower leaves, which wither and fall before the plant blooms, are petiolate and oblong lance-shaped. The upper leaves are narrower and lack petioles. The numerous, small, flowering heads are borne in an open, elongated inflorescence. Heads are 3-4 mm high with inconspicuous white ray flowers and white disk flowers. The involucre bracts are glabrous and overlapping.

This introduced species is common in fields, on roadsides, and in open forests in the valley and montane zones throughout our range. It is particularly common in recently disturbed soil. Our plants are var. glabrata (Gray) Cronq. Horseweed blooms from mid-summer into the fall. Throughout the U.S., s. Can. and parts of tropical America.

Coreopsis L. Tickseed

Coreopsis atkinsoniana Dougl.

Columbia Tickseed

[C. tinctoria Nutt.]

This species is a biennial or winter annual with stems that are frequently branched above and up to 1 m (3 ft) tall. The leaves are 1-2 times pinnately divided into thin, linear segments that are widely spaced on the stem. The conspicuous flowering heads are borne on long, slender stalks in an open inflorescence. Ray flowers are orange-yellow with reddish-brown bases and 1-2 cm long. The disk flowers are small and dark. Involucre bracts are in two series; the outer bracts are linear and reduced, while the inner are broadly lance-shaped and joined at the base.

Infrequent in gravelly soil along the banks of the Clark Fork River west of Missoula. B.C. to OR, east to Sask. and SD.

This attractive plant has become rare in our area and should not be picked.

Crepis L. Hawksbeard

Our species are perennials that have milky sap and a simple or branched taproot. The 1-4 stems are erect and usually branched above. The basal leaves are large and pinnately lobed or toothed with backward-pointing teeth. Stem leaves are reduced upward, becoming bractlike near the inflorescence. The heads are composed only of ray flowers and are borne in open, nearly flat-topped inflorescences. Ray flowers are yellow. The involucre is bell-shaped to cylindrical. The bracts are in 1-2 series, the outer ones less than 1/2 as long as the inner ones.

Hybridization, apomixis (asexual seed production) and polyploidy (multiplication of entire chromosome complements) are common in this genus and obscure differences between species making them difficult to identify. As a result, members of this genus are infrequently collected and are probably more common than our herbarium records would indicate.

1. Stem and leaves glabrous, not at all densely hairy; plants of moist meadows.....(6) C. runcinata
1. Stem and leaves with usually with some dense hair, at least when young; plants of dry grassland or open forest.....2
2. Basal part of the stem with conspicuous stiff, dark bristles (setae).....(4) C. modocensis
2. Basal part of stem without conspicuous setae.....3
3. Heads with mostly less than 12 flowers, plants often with more than 40 heads.....4
3. Heads with more than 10 flowers, plants rarely with more than 40 heads.....5
4. Involucral bracts glabrous.....(1) C. acuminata
4. Involucral bracts obviously hairy.....(3) C. intermedia
5. Leaves lobed more than 2/3 of width, lobes linear, mostly entire.....(2) C. atrabarba
5. Leaves lobed 2/3 of width or less, lobes broader, lance-shaped or triangular, some of them usually toothed.....(5) C. occidentalis

Group I. The first group consists of species with taller stems (up to 70 cm, 28 in) and relatively more numerous and smaller flowering heads.

1. Crepis acuminata Nutt.

Tapertip Hawksbeard

This species has 1-3 stems up to 70 cm (28 in) tall. The herbage is grayish-hairy when young but may become mostly glabrous with age. Leaves are pinnately lobed no more than 2/3 the width of the leaf. The lobes are cleft, toothed or entire-margined. The heads are small, containing only 5-10 flowers, and are borne in a large inflorescence that bears up to 100 heads. Flowers are 10-18 mm long. The involucral bracts are 8-16 mm long and mostly glabrous.

Tapertip hawksbeard is common in dry, open grassland and open forest habitats in the valley and montane zones. It has been collected on the slopes of Maclay Mountain and Mormon Peak in the northern Bitterroot Mountains and west of Missoula and Hamilton. East of the Cascades, WA to CA, east to MT and NM.

2. Crepis atrabarba Heller

Slender Hawksbeard

This plant is similar to C. acuminata with 1-2 stems up to 70 cm (28 in) high and grayish-hairy foliage, but the leaves are more deeply lobed, generally at least 4/5 of the leaf width. The lobes are narrowly linear and mostly entire-margined. The heads have 10-40 flowers each and are borne in an inflorescence of 3-40 heads. Flowers are 10-18 mm long. The involucral bracts are 8-15 mm long and grayish-hairy.

A relatively distinct species it, is common in dry, grassy habitats in the valley and montane zones. It has been collected near Victor and Hamilton, on the lower slopes of East St. Joseph Peak, and in Pattee Canyon east of Missoula. East of the Cascades, B.C. to NV, east to Alta. and CO.

We have two forms of C. atrabarba in our area. Smaller plants, up to 35 cm (14 in) tall, with fewer than 18 heads and some stiff, black bristles on the involucral bracts are ssp. atrabarba. Taller plants, usually 30-70 cm (12-28 in) high, with up to 40 heads and few or no bristles on the bracts are ssp. originalis Babco. & Stebb.

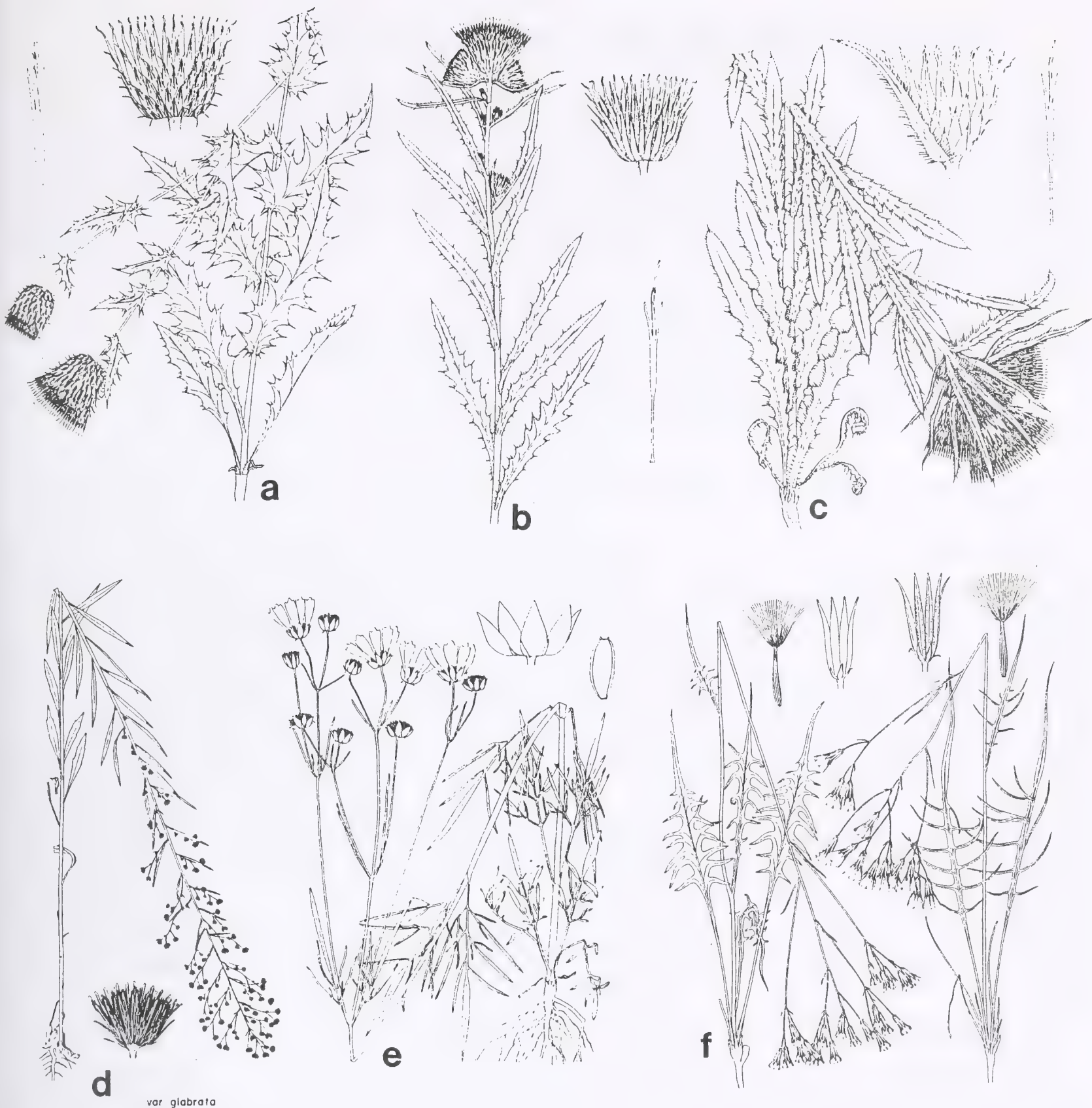
3. Crepis intermedia Gray

Gray Hawksbeard

Plants have 1-2 stems up to 70 cm (28 in) tall and herbage that is grayish-hairy. Leaves are pinnately divided with entire or toothed lobes. The lobes are about 2/3 the width of the leaf. The inflorescence has 10-60 heads with 7-12 flowers each. Flowers are 14-30 mm long. The involucral bracts are 10-16 mm long, generally hairy below and nearly glabrous above.

Gray hawksbeard occurs in dry grassland habitats in the lower foothills of the Bitterroot Mountains between Darby and Victor. East of the Cascades, WA to CA, east to Alta. and CO.

C. intermedia is a name of convenience for a group of asexually reproducing polyploid hybrids involving C. acuminata, C. occidentalis, C. atrabarba and C. modocensis.



a. *Cirsium undulatum* b. *C. hookerianum* c. *C. scariosum* d. *Conyza canadensis*
 e. *Coreopsis atkinsoniana* f. *Crepis acuminata* g. *C. atrabarba*

COMPOSITAE

Group II. The second group contains plants that are generally less than 30 cm (1 ft) tall with relatively fewer and larger flowering heads.

4. Crepis modocensis Greene

Low Hawksbeard

Low hawksbeard has 1-4 stems mostly 15-30 cm (6-12 in) tall, the basal portion covered with stout bristles. The leaves and stems are grayish-hairy when young. The basal and lower stem leaves are pinnately divided into lance-shaped, toothed, or lobed segments. The ultimate teeth or lobes are tipped with a short spine. The inflorescence has 1-9 heads with 10-60 flowers each. Involucral bracts are 11-16 mm long, grayish-hairy, and provided with stout, black bristles.

The plant has been collected on a dry bunchgrass slope in the northern Bitterroot Mountains at an elevation of 1680 m (5,500 ft). B.C. to CA, east to MT and CO.

5. Crepis occidentalis Nutt.

Western Hawksbeard

Western hawksbeard has mostly solitary stems that are 10-40 cm (4-16 in) tall. The herbage is silvery gray-hairy throughout. The leaves are deeply pinnately divided into toothed lobes. The lobes often point toward the base of the leaf. The inflorescence has 2-25 heads with 10-40 flowers each. The involucral bracts are 11-19 mm long, often with some gland-tipped bristles.

This species occurs in dry grasslands of the valley zone. B.C. to CA, east to Alta., SD, and NM.

Plants in our area are referred to ssp. costata (Gray) Babco. & Stebb. Plants occurring on the west slopes of the Sapphire Range appear to be a distinctive form of the species.

Group III. This third group contains a single distinct species with nearly leafless stems. It occurs in moist rather than dry habitats.

6. Crepis runcinata (James) T. & G.

Meadow Hawksbeard

This hawkbeard species has mostly leafless stems 20-70 cm (8-28 in) tall from 1-several strong roots. The basal leaves are lance-shaped to elliptical in outline and entire or more often toothed or lobed with the lobes pointing down toward the base of the leaf. The herbage is green, not grayish hairy. The inflorescence has 1-30 heads with 20-50 flowers in each. The involucre is broadly bell-shaped and 8-21 mm high.

The plant occurs in moist meadows in the valley and montane zones. It has been collected at 2000 m (6,500 ft) above the Trapper Creek Trail in the southern Bitterroot Mountains. East of the Cascades, WA to CA, east to Man., NE, and NM.

Erigeron L. Fleabane, Daisy

These plants are annual, biennial, or perennial herbs with alternate or basal, entire or divided leaves. Flowering heads are usually radiate with few or, more often, numerous, narrow rays of various shades of white, pink, blue, purple, or occasionally yellow. Disk flowers are numerous and yellow. The involucral bracts are narrow, overlapping and nearly equal in length. The pappus is generally of white, thin (capillary) bristles.

This is a large genus with daisylike flowering heads, similar to the asters. For a discussion of the differences between the two genera, see comments under Aster. At lower elevations, our perennial fleabaness flower from early May (E. compositus) to mid-summer. When trying to identify species in this group, pay careful attention to the involucral bracts, leaves, and root systems. The presence of clear or amber-colored globular cells, either sessile or at the tip of hairs (glands, glandular hairs) should be noted.

1. Ray flowers inconspicuous, hairlike, erect, less than 2 mm longer than the involucral bracts.....2
1. Ray flowers conspicuous, flared to the horizontal, exceeding the involucre by more than 2 mm.....3
2. Involucral bracts more-or-less glandular; flower stalks longer than subtending leaves.....(7) E. acris
2. Involucral bracts hairy but not glandular; lower flower stalks shorter than subtending leaves.....(12) E. lonchophyllus
3. Plants annual, biennial or short-lived perennial without a rhizome or well-developed woody caudex....4
3. Plants perennial with a rhizome or well-developed woody caudex.....7
4. Middle stem leaves without petioles, clasping the stem.....(11) E. philadelphicus
4. Middle stem leaves petiolate, not clasping the stem.....5
5. Pappus of the ray flowers inconspicuous or absent.....(18) E. strigosus
5. Pappus of the ray flowers of well-developed bristles at least 2 mm long.....6
6. Plants with a taproot.....(17) E. divergens
6. Plants fibrous-rooted.....(9) E. glabellus

7. Middle stem leaves well-developed, at least 5 mm wide, plants usually more than 30 cm tall.....8
 7. Middle stem leaves reduced, less than 5 mm wide, plants often less than 30 cm tall.....11
8. At least the lower leaves generally toothed.....(10) E. coulteri
 8. Leaves entire or sometimes slightly toothed.....9
9. Ray flowers 2-4 mm wide.....E. peregrinus
 9. Ray flowers less than 2 mm wide.....10
10. Upper leaves pubescent; stems hairy below.....(6) E. subtrinervis
 10. Upper leaves glabrous or hairy only on the margins; lower stem glabrous.....(5) E. speciosus
11. Ray flowers yellow.....(4) E. linearis
 11. Ray flowers white, pink, blue, or purple.....12
12. Basal and lower stem leaves divided into linear segments.....(1) E. compositus
 12. Leaves entire or toothed, not divided.....13
13. Plants of upper subalpine to alpine zones.....14
 13. Plants occurring mainly in the valley and montane zones.....18
14. Involucral bracts obviously glandular.....15
 14. Involucral bracts not glandular or obscurely so.....16
15. Ray flowers more than 2 mm wide; moist meadows and subalpine forests.....(8) E. peregrinus
 15. Ray flowers less than 2 mm wide; dry, rocky habitats.....(14) E. caespitosus
16. Plants with many fibrous roots from a simple rootstock.....(13) E. simplex
 16. Plants with an evident taproot or central underground axis.....17
17. Ray flowers white.....(16) E. evermannii
 17. Ray flowers blue.....(15) E. rydbergii
18. Involucral bracts not glandular, stem usually purplish at the base.....(3) E. corymbosus
 18. Involucral bracts glandular (use 10X hand lens), stems not purplish.....19
19. Hairs on leaf blades short and curly, hairs of petioles less than 1 mm long, basal leaves often with 3 nerves.....(14) E. caespitosus
 19. Hairs on leaf blades not curled, hairs of petioles greater than 1 mm and spreading, basal leaves rarely with three nerves.....(2) E. pumilus

Group I. The first group consists of perennial species from a taproot and branched caudex, rarely over 30 cm (1 ft) tall. These plants occur in dry, exposed habitats such as rock outcrops, dry rangeland, and roadsides.

1. Erigeron compositus Pursh

Cutleaf Daisy

This is a small, tufted plant, rarely more than 20 cm (8 in) high, with lower leaves up to 6 cm (2 in) long. The blade is deeply divided into several groups of 3 linear segments; the petiole is often twice the length of the blade. Upper leaves are small and lobed to entire. The leaves and stem are blue- or gray-green and sparsely covered with hair. Flower heads are solitary. The rays are up to 12 mm long and mostly white, sometimes light blue or pink. Involucral bracts are 5-10 mm long and glandular hairy.

Common and widespread in dry, rocky habitats from the valley floor to alpine summits. AK to CA, east to Greenl., Que., SD, and AZ.

This is our only Erigeron species with dissected leaves. Plants that appear to be without ray flowers are locally common. The heads do have rays, but they are greatly reduced and are visible only on close examination. These plants are suspected of being apomictic (producing seed without sexual recombination) (John Beaman, Michigan State University, personal communication).

Nearly all of our plants are var. glabratus Macoun. with leaves that are 2-3 times divided into 3's. Var. compositus, with largest leaves that are 3-4 times divided into long, linear segments, has been collected on gravel bars along the Bitterroot River.

2. Erigeron pumilus Nutt.

Shaggy Fleabane

This species has stems up to 30 cm (1 ft) tall from a taproot and caudex. The leaves are narrowly lance-shaped and gradually reduced upwards. Both leaves and stems are covered with spreading gray hairs. The stems are branched above, forming an inflorescence with few to several flowering heads. There are 50-100 light blue, or occasionally white or pink, ray flowers. Involucral bracts are 4-7 mm long, spreading hairy, and lightly glandular.



a. *Crepis intermedia* b. *C. modocensis* c. *C. occidentalis* e. *Erigeron compositus* f. *E. pumilus*

This species is common in grasslands and open ponderosa pine forests in the valley and montane zones. Our plants are ssp. intermedius Cronq. var. euintermedius Cronq. B.C. to CA, east to Sask., KN, and NM.

3. Erigeron corymbosus Nutt.

Foothill Daisy

Foothill daisy has nearly erect stems, 10-50 cm (4-20 in) tall, from a taproot or caudex. The stems are purple at the base and branched above or occasionally simple. Basal leaves are narrowly lance-shaped, up to 25 cm (10 in) long, and evidently 3-nerved. The stem leaves are gradually or considerably reduced upwards. The leaves and stem are short hairy, but do not appear gray. The several to many (occasionally solitary) flowering heads are borne on long stalks. Rays are 7-13 mm long and deep blue to violet. The involucre bracts are 5-7 mm long with long, white hairs.

This plant occurs in dry grassy habitats. It has not been collected on the valley floor, but is known from locations in the foothills of the Bitterroot Mountains such as Maclay Mountain southwest of Lolo at 1740 m (5,700 ft).

4. Erigeron linearis (Hook.) Piper

Yellow Daisy

Yellow daisy is a perennial from a deep-seated taproot. The stems are erect and 5-20 cm (2-8 in) tall. Leaves are linear, 2-9 cm (1-4 in) long, and mainly basal. The foliage is covered with short, gray hairs. The petioles of the basal leaves and the base of the stem are hardened and straw-colored or purplish. Flower heads are mostly solitary. The rays are yellow and 4-11 mm long. Involucre bracts are 4-7 mm long with short, straight hairs.

This plant occurs in dry, open forests. It has been collected once in our area, on a ridge above Sheafman Creek in the Bitterroot Mountains northwest of Hamilton. B.C. to CA; east to NV and nw. WY.

This is our only Erigeron with yellow rays. It is a rare plant in Montana.

Group II. The second group has three taller species which occur in open to partially shaded habitats with moist but well-drained soils. They are often found growing with grasses and tall forbs.

5. Erigeron speciosus (Lindl.) DC.

Showy Fleabane

Showy fleabane has clustered stems, 30-50 cm (12-20 in) tall, from a woody caudex. The plants are glabrous below the inflorescence. The numerous basal and lower stem leaves are narrowly lance-shaped, petiolate, and 3-nerved. Upper leaves are smaller and without petioles. The few to several large flowering heads are borne in a nearly flat-topped inflorescence. The purplish-blue or violet rays are numerous and 9-18 mm long. Involucre bracts are 6-9 mm long and glandular.

Common in moist grasslands and open forests from the valley to lower subalpine zones. It is more common on soils derived from sedimentary rock than on those on the west side of the Bitterroot Valley derived from granite. B.C. to OR and NV, east to MT, SD, and NM.

Several horticultural forms have been derived from this attractive native.

6. Erigeron subtrinervis Rydb.

Three-veined Fleabane

This fleabane is very similar to E. speciosus, but the herbage is spreading hairy and the leaves tend to be more ovate.

Three-veined fleabane occurs in dry, open forest habitats. It is reported for the west slopes of the Sapphire Range. Our plants are var. conspicuus (Rydb.) Cronq. B.C. to UT, east to Alta., NE, and NM.

7. Erigeron acris L.

Bitter Fleabane

These inconspicuous biennial or short-lived perennial plants have solitary or small clusters of stems 5-80 cm (2-20 in) tall. The lower leaves are spoon-shaped with long petioles. The upper leaves are more linear, without petioles, and gradually reduced toward the top. Herbage is often covered with stiff, spreading hairs. The flowering heads are solitary to many in an open inflorescence. The white to tan pappus is longer than the disk flowers. The numerous, narrow, white or light pinkish-purple ray flowers are inconspicuous and barely longer than the pappus. Rays are held erect rather than being flared to the horizontal as in most other species. The involucre bracts are long-pointed and up to 4 mm in length.

E. acris has two varieties in our area. Var. asteroides (Andrz.) Bess. is usually at least 30 cm (1 ft) tall with several to many flower heads. It occurs in open forest habitats in the valley and montane zones. Var. debilis Gray is usually less than 30 cm high with solitary heads. Small populations of this variety are widely scattered in open, moist habitats in the subalpine to alpine zones. A circumpolar species, south to CA, CO, and ME.

Group III. The third group of Erigeron species occurs in mesic habitats such as moist meadows, streambanks, and forested slopes with seasonally or permanently wet soil. They can be found from the valley up through the subalpine zones.

8. Erigeron peregrinus (Pursh) Greene

Wandering Fleabane

Wandering fleabane has mostly solitary stems, up to 60 cm (2 ft) tall, from a rhizome or short caudex with numerous fibrous roots. Herbage is mostly glabrous and dark green. The numerous leaves, both basal and stem, are broadly lance-shaped to narrowly spoon-shaped and blunt or rounded at the tip. The large, flowering heads are mostly solitary or few per stem. The rose-purple or violet rays are 8-25 mm long, while the disk flowers are bright yellow. Involucral bracts are 7-11 mm long, linear and equal in length.

The plant is abundant in montane, subalpine and alpine meadows throughout our area. It is also sparsely distributed in montane and subalpine forests. Our plants belong to ssp. callianthemus (Greene) Cronq. and can be placed in two varieties. Var. eucallianthemus Cronq. is usually 20-60 cm (8-24 ft) tall with stem leaves not much reduced upwards. It is common in the montane and subalpine zones. Var. scaposus (T. & G.) Cronq. is generally less than 20 cm tall with broader leaves, those of the stem without petioles and greatly reduced upwards. The involucral bracts are finely glandular but nearly hairless. It is common in the timberline and alpine zones. AK to CA, east to Alta. and NM.

9. Erigeron glabellus Nutt.

Smooth Daisy

This species is a biennial or perennial with 1-few erect stems, up to 50 cm (20 in) tall, from a fibrous-rooted caudex. The foliage has a sparse covering of white hairs. The lower leaves are up to 9 cm (4 in) long, narrowly lance-shaped with a prominent midvein, and petiolate. Upper leaves are gradually reduced and lack a petiole. The large flowering heads are solitary or few per stem. Rays are 8-15 mm long and blue in our area. The involucral bracts are 5-9 mm long and hairy but not glandular.

In the northern part of our area, smooth daisy occurs in scattered small populations in moist river-bottom meadows such as in Lee Metcalf Refuge near Stevensville and on the islands in the Clark Fork River west of Missoula. AK to UT, east to WI and SD.

Our plants belong to var. glabellus.

10. Erigeron coulteri Porter

Coulter's Daisy

This is a perennial with mostly single stems, up to 40 cm (16 in) tall, from a fibrous-rooted, slender rhizome or branched caudex. The leaves are up to 9 cm (4 in) long, broadly lance- to egg-shaped in outline, and hairy on the upper surface. The lower leaves are petiolate and often toothed. The upper ones are reduced and clasp the stem without petioles. The flowering heads are solitary or few per stem. Rays are white and 9-24 mm long. The involucral bracts are equal and 7-10 mm long with dense long hairs.

Coulter's daisy is locally common in meadows in the montane and subalpine zones south of Lost Horse Creek in the Bitterroot Mountains. Many years ago, it was collected near Lolo Hot Springs, but it can no longer be found there. ID and MT south through ne. OR to CA.

11. Erigeron philadelphicus L.

Philadelphia Fleabane

This species is a biennial or short-lived perennial with a fibrous root system and stems up to 70 cm (28 in) tall. The leaves are lance- to spoon-shaped and usually toothed. The lower leaves are up to 15 cm (6 in) long and petiolate, becoming much reduced and clasping the stem upwards. Herbage is long, spreading-hairy, sometimes sparsely so. The 1-several flowering heads are borne in an open inflorescence. The numerous blue (ours), pink or white rays are up to 10 mm long. Involucral bracts are 4-6 mm long with a hairy, brownish midvein and white margins.

Philadelphia fleabane occurs in moist, open, lightly disturbed habitats in the valley zone. In our area it is known from the banks and the islands of the Bitterroot and Clark Fork rivers near Missoula. Throughout most of the U.S. and s. Can.

12. Erigeron lonchophyllus Hook.

Spearleaf Fleabane

Spearleaf fleabane is a biennial or short-lived perennial with 1-few erect, spreading hairy stems 2-25 cm (1-10 in) tall. The basal leaves are broadly lance-shaped, while stem leaves are linear. The flower stalks are mostly erect, the lower surpassed by the subtending leaves. The hairy but eglandular involucral bracts are 9 mm long with pointed, purple tips. The white rays are only 2-3 mm long. The pappus is longer than the disk corollas.

This fleabane is found in moist to wet, neutral or alkaline, open habitats in the mountains. In our area it is uncommon and has been found only in the Sapphire Range. AK to CA, east to Que., ND, and NM.

Group IV. The fourth group contains species that occur near or above timberline.

1. Erigeron compositus Pursh

Cutleaf Daisy

Common in dry habitats up to the highest elevations. See description above.



a. *Erigeron lonchophyllus* b. *E. linearis* c. *E. corymbosus* d. *E. speciosus* e. *E. subrinervis*
 f. *E. acris* g. *Erigeron peregrinus* h. *E. coulteri* i. *E. glabellus* j. *E. philadelphicus*

COMPOSITAE

7. Erigeron acris L.

Bitter Fleabane

Var. debilis Gray occurs in widely scattered locations in mesic habitats at high elevations. See description above.

8. Erigeron peregrinus (Pursh) Greene

Wandering Daisy

Var. scaposus (T. & G.) Cronq. occurs in meadows near or above timberline. See description above.

13. Erigeron simplex Greene

Alpine Daisy

Alpine daisy is a dwarf perennial from a short, fibrous-rooted caudex. The erect stems, covered with long, sticky hairs, are unbranched and usually solitary. Basal leaves are up to 8 cm (3 in) long and broadly lance-shaped to narrowly spoon-shaped with petioles and blunt or rounded tips. The few stem leaves are linear and much smaller. Flower heads are solitary on the end of the stems. The rays are 7-11 mm long and usually light, purplish blue, though occasionally white or pink. Involucral bracts are 5-8 mm long and moderately to densely covered with white-woolly hairs.

This species is common in seasonally moist or wet meadows and open forests in the upper subalpine to alpine zones in the Bitterroot Mountains. MT south to NV and NM.

Early in the season, there is an impressive display of alpine daisies on the long ridge crest of St. Joseph Peak.

14. Erigeron caespitosus Nutt.

Tufted Fleabane, Tufted Daisy

Plants of this perennial species are up to 15 cm (1 ft) tall with stems that curve at the base and are clustered on a branched caudex and taproot. The basal leaves are narrowly spoon-shaped with 3 veins (outer 2 sometimes obscure) and blunt or rounded tips. Stem leaves are linear to egg-shaped. The stem and leaves are grayish short-hairy. Flower heads are mostly solitary or occasionally up to 3 per stem. The blue rays are 5-15 mm long. The overlapping involucral bracts are 4-7 mm high, glandular, densely short-hairy, and thickened on the back.

Tufted fleabane is common in dry, rocky, open habitats in the mountains throughout our area. It is particularly common on the steep east-facing slopes of the Bitterroot Mountains, on bare bedrock at 1520 m (5,000 ft) to over 2740 m (9,000 ft) in the southern part of the range. AK to WA, east to the Great Plains.

15. Erigeron rydbergii Cronq.

Rydberg's Daisy

Rydberg's daisy is a perennial with stems less than 8 cm (3 in) tall clustered on a branched caudex and taproot. The basal leaves are narrowly lance-shaped and up to 5 cm (2 in) long. The several stem leaves are linear in outline and greatly reduced. Stems and leaves are usually densely short hairy. The flower heads are solitary. Rays are 6-9 mm long and violet-blue. The involucral bracts, 5-6 mm long, are finely hairy and sticky, but not thickened on the back.

This species is locally common on barren summits of the Bitterroot Range above 2740 m (9,000 ft). Southwest MT and adjacent WY and ID.

E. rydbergii and E. caespitosus intergrade in the Bitterroot Mountains.

16. Erigeron evermannii Rydb.

Evermann's Daisy

This dwarf perennial species stems up to 10 cm (4 in) tall from a branched caudex and long, deep-seated taproot. The glabrous basal leaves are up to 4 cm (2 in) long, spoon-shaped, and rounded at the tip. Stem leaves are greatly reduced or lacking. Flower heads are solitary. The rays are 6-10 mm long and white or occasionally light blue. Involucral bracts are 5-8 mm long, spreading hairy, and usually glandular.

In our area, this plant occurs on mineral soils of unstable slopes at elevations of 2680-2930 m (8,800-9,600 ft) on Trapper Peak and Bare Peak in the southern Bitterroot Mountains. Central ID and adjacent MT.

Group V. The fifth group contains annual, biennial, or short-lived perennial, native, species, common at lower elevations in disturbed soil and overgrazed grasslands.

17. Erigeron divergens T. & G.

Spreading Fleabane

Spreading fleabane is a biennial or short-lived perennial from a weak taproot. The usually much-branched stems are up to 70 cm (28 in) tall and often curved at the base. The petiolate basal leaves wither early and are up to 25 mm (1 in) long, lance- or spoon-shaped. The numerous stem leaves are reduced in size and linear in outline. Stem and leaves are covered with short, spreading hairs and appear gray-green. The few to numerous flower heads are borne in an open inflorescence. Rays are 5-10 mm long and light blue or violet, occasionally white or pink. The involucral bracts are 4-5 mm long, glandular, and spreading hairy.

This fleabane is common in grasslands and disturbed areas in the valley and montane zone throughout our area. Our plants are var. divergens. B.C. to CA, east to Alta., OK, and Mex.

18. Erigeron strigosus Muhl.

Daisy Fleabane

This species is an annual or biennial with 1-several erect stems up to 60 cm (2 ft) tall that are branched in the upper half. Leaves are narrowly lance-shaped, up to 12 cm (4 in) long, petiolate below, reduced above, and becoming linear and bract-like in the inflorescence. The foliage is finely hairy throughout. Flower heads are few to many in an open, flat-topped inflorescence. Rays are white and up to 6 mm long. The involucre bracts are 2-5 mm long, hairy, and sparsely glandular.

Uncommon in grasslands, open forests and disturbed areas in the valley and montane zones. Most of our plants are referable to var. strigosus. Var. septentrionalis, distinguished by having longer and more spreading stem hairs, has been collected in the montane zone. Widespread throughout U.S. and s. Can.

Eriophyllum Lag. Eriophyllum

Eriophyllum lanatum (Pursh) Forbes

Oregon Sunshine

Plants are densely woolly-hairy perennials. Stems that branch freely from the base are usually no more than 25 cm (10 in) tall. Leaves are highly variable, 1-8 cm long and entire to pinnately lobed (depending on variety). Both ray and disc flowers of the numerous heads are bright yellow-orange.

The taller and more open-growing variety lanatum, has pinnately lobed leaves. It always occurs on sunny, dry, and often steep slopes and roadcuts at elevations up to 1830 m (6,000 ft). This variety ranges south in the Bitterroot Mountains from Mormon Peak to Painted Rocks Reservoir. The compact, dwarf variety integrifolium (Hook.) Smiley is distinguished by entire, mostly alternate leaves. It is known from scattered locations south of Trapper Peak and above 2775 m (9,100 ft) in alpine communities on East Boulder Peak.

Oregon sunshine blooms from June to August; it ranges from B.C. to CA, east to W. MT, W. WY, and UT.

Eupatorium L. Boneset

Eupatorium occidentale Hook.

Pink Boneset

The few to many stems of pink boneset, a rhizomatous perennial, are about 40 cm (16 in) tall and arise from a woody base. Leaves are mostly alternate, toothed, with a petiole, and an outline that is roughly triangular to egg-shaped. The central and 2 lateral nerves are more prominent than the other netted veins. Arising from a branched and rounded or elongated inflorescence, the bright rose-pink flower heads are composed of disc flowers only.

This attractive plant is characteristically found on rocky sites at various elevations. It has been recorded from a south-facing boulderfield at 2135 m (7,000 ft) on Mount Jerusalem, a south-facing rockslide above Chaffin Creek Trail at 1950 m (6,400 ft), and in the Sapphire Range above the Skalkaho-Rye Creek Road. It occurs from central WA to ID, south to CA and east to UT.

Filago L. Filago

Filago arvensis L.

Field filago

This simple or freely branching annual is up to 40 cm (16 in) tall and entirely white-woolly. Leaves are linear, entire, and erect. Numerous, small (to 5 mm high), whitish, and uniquely structured flower heads are borne on each stem.

Field filago is a recently introduced European weed that appears to be spreading in Ravalli County through invasion of overgrazed pastures. From se. B.C. to adjacent WA, ID, and MT.

Gaillardia Foug. Gaillardia

Gaillardia aristata Pursh

Blanket Flower

Arising from a slender taproot, blanket flower is a perennial with 1-several simple or branched stems up to 50 cm (20 in) tall. Foliage is hairy and grayish-green. Narrow, alternate leaves are entire or more commonly coarsely toothed to pinnately divided. The 1-few flower heads are comprised of purple or brown (rarely yellow) disc flowers and yellow ray flowers twice notched at the tip and suffused with red at the base.

This colorful species is common in the open foothills and also mountain grasslands to 2290 m (7,500 ft). Ranging from B.C. to Sask., south to n. OR, n. UT, CO, and SD.



a. *Erigeron simplex* b. *E. caespitosus* c. *E. rydbergii* d. *E. evermannii* f. *E. divergens* f. *E. strigosus*
g. *Eriophyllum lanatum* h. *Eupatorium occidentale* i. *Filago arvensis* j. *Gailardia aristata*

Gnaphalium L. Cudweed

Cudweeds are annuals, biennials, or short-lived perennials with mostly white-woolly herbage and entire, alternate leaves resembling those of Antennaria (pussytoes). In contrast to the pussytoes, cudweeds have both sexes on the same plant (monoecious) and are mostly taprooted, with often scant and early deciduous lower foliage. Flower heads are composed of only disc flowers (yellow, cream, or off-white), the involucre being egg- or bell-shaped with bracts that are thin, dry, and membranous throughout, or at least at the tip.

1. Involucre mostly 2-4 mm high, plants usually less than 20 cm (8 in) tall, mostly many-branched.....(1) G. palustre
1. Involucre mostly more than 4 mm high, plants often over 20 cm tall and not branched.....2
2. Plants glandular hairy, foliage sticky when crushed.....(4) G. viscosum
2. Plants not glandular hairy.....3
3. Base of leaves lobed and clasping the stem.....(2) G. chilense
3. Base of leaves not lobed and clasping.....(3) G. microcephalum

GROUP I. This group represents the smallest and most common species.

1. Gnaphalium palustre Nutt.

Lowland Cudweed

Stems of lowland cudweed rarely exceed 15 cm (6 in) and are usually much shorter. This densely woolly-haired, much branched annual has weakly developed, fibrous roots. Leaves are oblong or lance-shaped (2 to 4 times longer than wide). Flower heads are arranged in small, leafy-bracted clusters in leaf axils and at the ends of branchlets. Bracts of the obscured involucre are brown with whitish tips.

This species is found at lower elevations on moist, open areas such as vernal pools and mudflats of streams and ponds. From B.C. and Alta. south to s. CA and NM.

GROUP II. This group has three species that are much taller than G. palustre with stems up to 70 cm (28 in).

2. Gnaphalium chilense Spreng.

Cotton-batting Plant

The nonglandular, interwoven, and tangled hairs of the cotton-batting plant appear more dense than those of the other species. The leaves of this annual or biennial have ear-shaped lobes that are somewhat clasping. Flower heads are arranged in 1-few dense clusters. The involucre is more yellowish than those of the following 2 species.

This plant generally occurs in moister habitats than do the following species. From sw. B.C. south to s. CA, and TX.

3. Gnaphalium microcephalum Nutt.

White Cudweed

White cudweed, though similar to G. chilense, is usually a multi-stemmed, short-lived, taprooted perennial. Leaves are broadly linear or lance-shaped with the winged petiole adhering to the stem past its point of insertion. Flower heads are arranged in many dense clusters that form a broad, whitish inflorescence. Pointed bracts of the involucre have an evident midrib.

This species grows on well-drained soils (dry habitats); it often occurs on logged or burned forested areas. From B.C. south to CA and east to MT and CO.

Sometimes confused with Antennaria luzuloides, G. microcephalum is distinguished by its taproot.

4. Gnaphalium viscosum H.B.K.

Sticky Cudweed

Sticky cudweed is 40-90 cm (16 to 35 in) tall and an annual or biennial distinguished from the above 2 species by foliage with glandular hairs (sticky feel). The inflorescence is branched, sometimes elongated, and many-headed. Involucral bracts are yellowish to grayish-white and sharply acute.

This plant occurs on well-drained soils of open areas within the forested foothills. From B.C. to Que., south to TN, Mex., and OR.

Grindelia Willd. GumweedGrindelia squarrosa (Pursh) Dunal

Gumweed

Gumweed is a taprooted biennial or short-lived perennial with several stems 10-100 cm (4 to 40 in) tall. Alternate, oblong, and sessile leaves are resinous and coarsely toothed to serrate or even entire. Middle and upper leaves clasp the stem. The regularly overlapping involucre bracts glisten with a gummy

COMPOSITAE

resin, the source of the plant's strong, pungent odor. The outer, green bracts are evidently reflexed. Ray and disc flowers are bright yellow.

This plant is a common native weed of disturbed sites. It is frequently encountered along logging roads on the east slopes of the Bitterroot Mountains, to 1830 m (6,000 ft). From B.C. east to MN and south to CA and TX.

Grindelia nana is similar but distinguished by having smaller heads and several leaflike, reflexed bracts immediately beneath the involucre. G. nana could also be found in our area, but it has not yet been collected.

Gutierrezia Lag. Snakeweed

Gutierrezia sarothrae (Pursh) Britt. & Rusby

Broom Snakeweed

Broom snakeweed is a dwarf shrub with erect branches 20-50 cm (8-20 in) Tall. The dark green, punctate leaves are narrowly linear. Numerous small flower heads, comprised of only short, yellow ray flowers, are borne in clusters. Aggregates of clusters form a somewhat flat-topped inflorescence. Plants bloom in late summer.

Snakeweed grows on well-drained soils in open habitats of valley and montane zones. It increases considerably with overgrazing or disturbance. From Sask. and Alta. to se. WA and e. OR, south to CA, Mex., and KN.

Haplopappus Cass. Goldenweed

Members of this genus are taprooted or occasionally rhizomatous perennials and low shrubs. Basal leaves are often numerous and well-developed. The stem leaves are alternate and reduced upwards. Flower heads are radiate with yellow disk and ray flowers. The involucral bracts vary in texture, color and disposition.

1. Plants shrubby, woody well above ground level.....(8) H. suffruticosus
1. Plants herbaceous, sometimes woody at the base.....2
2. Rays absent.....(9) H. aberrans
2. Rays usually present.....3
3. Plants not mat-forming; occurring in moist meadows.....4
3. Plants usually forming mats or cushions with a much branched caudex or rhizome, occurring in drier habitats.....6
4. Leaves usually entire-margined.....(2) H. integrifolius
4. At least some leaves usually toothed.....5
5. Flower heads generally solitary, occasionally 2 per stem.....(3) H. uniflorus
5. Usually more than 2 heads per stem on well-developed plants.....(1) H. lanceolatus
6. Plants rhizomatous, occurring at timberline or above.....(7) H. lyallii
6. Plants from a branched caudex, usually occurring below timberline.....7
7. Involucral bracts mostly obtuse or rounded.....(5) H. armerioides
7. Involucral bracts mostly acute.....8
8. Leaves soft, often white-hairy.....(6) H. lanuginosus
8. Leaves stiff, without hair.....(4) H. acaulis

Group I. The members of this genus are divided into 4 groups based on size, habit of the plants, and habitat. This first group consists of species that are relatively tall and taprooted. The solitary or few stems are curved at the base and at least 12-30 cm (5-12 in) tall. The lance-shaped to narrowly elliptical basal leaves are numerous and tufted. Stem leaves are reduced in size and without petioles above. The herbage is nearly glabrous and green to grayish with dense, long hairs. These species occur at low to moderate elevations.

1. Haplopappus lanceolatus (Hook.) T. & G.

Lance-leaved Goldenweed

The foliage of this species is green and only slightly hairy. The margins of the leaves are entire or with spine-tipped teeth. 1-several flower heads are borne on long stalks in a flat-topped inflorescence. The overlapping involucral bracts are 5-10 mm long and conspicuously green-tipped. The 10-45 rays are 5-10 mm long.



a. *Gnaphalium palustre* b. *G. chilense* c. *G. microcephalum* d. *G. viscosum* e. *Grindelia squarrosa*
 f. *Gutierrezia sarothrae* g. *Haplopappus lanceolatus*

COMPOSITAE

This goldenweed is locally common in lush, moist meadows in the Bitterroot Valley near Lolo. OR to CA, east to Sask. and NE.

2. Haplopappus integrifolius Gray

Entire-leaved Goldenweed

The leaves of this species are sparsely hairy and entire-margined. The taproot is very large and sturdy. The large flower heads are usually solitary; however, 1-2 smaller heads may occur in the axils of the upper leaves. The involucre bracts are 10-15 mm long, overlapping and subequal. They are green or green-tipped. The 25-50 rays are 1-2 cm long.

This species is uncommon in our area. It occurs in moist meadows in the valley zone. Southeastern ID, nw. WY, and w. MT.

3. Haplopappus uniflorus (Hook.) T. & G.

One-flowered Goldenweed

One-flowered goldenweed is generally a smaller plant than the previous 2 species. The leaves are often finely toothed and usually densely covered with long hair that gives the foliage a gray appearance. The flower heads are solitary. The involucre bracts are 6-10 mm long and not much overlapping. The 25-50 rays are 6-10 mm long.

This plant is rare in our area. It occurs in moist meadows of the lower subalpine zone in southern Ravalli County near the Continental Divide. Our plants are var. uniflorus. OR to CA, east to Sask., MT, and CO.

Group II. This group consists of low-growing, densely tufted species with stout taproots. The numerous stems are usually about 10 cm (4 in) tall with few leaves. The basal leaves are erect, lance-shaped, mostly 3-nerved, and entire-margined. The flower heads are solitary.

4. Haplopappus acaulis (Nutt.) Gray

Cushion Goldenweed

The stem leaves of this species are greatly reduced. The leaves are usually 1-5 cm long and glabrous to sparsely hairy. The involucre bracts are 6-10 mm long and sharp-pointed. The 6-15 rays are 8-12 mm long.

Cushion goldenweed is common east of us but is rare in our area. It occurs in dry, open habitats on shale and limestone outcrops in the Sapphire Range in the valley and lower montane zones. OR to CA, east to Sask. and CO.

5. Haplopappus armerioides (Nutt.) Gray

Thrift Goldenweed

This goldenweed has well-developed stem leaves. Occasionally there is a second, smaller flowering head on a stalk from the base of an upper stem leaf. The basal leaves are 3-8 cm (1-3 in) long and resinous-glandular. The blunt or rounded involucre bracts are 8-13 mm long with prominent green tips. The 8-13 rays are 10-14 mm long.

The plant is not common in our area. It occurs on dry, calcareous outcrops in the valley and lower montane zones. It has been collected near the Continental Divide in southern Ravalli County and in the foothills of the Sapphire Range east of Victor. Great Plains west to MT and AZ.

Group III. This group contains species that occur from montane to alpine elevations.

6. Haplopappus lanuginosus Gray

Woolly Goldenweed

Woolly goldenweed is densely tufted from a branched caudex that tends to be fibrous rooted. The stems are up to 20 cm (8 in) tall with leaves reduced upwards. The crowded, basal leaves are erect, lance-shaped and entire-margined. The herbage is glandular and covered with dense white hair. The flower heads are solitary. The involucre bracts are 6-12 mm long and subequal. The 7-20 rays are 8-12 mm long.

The plant occurs in dry, shallow, mineral soils of ridge crests or rock outcrops from the montane zone to timberline. There are several collections from the Bitterroot Mountains south of Trapper Peak at elevations of 1520-2770 m (5,000-9,100 ft). Our plants are var. andersonii (Rydb.) Cronq. WA and OR, east to ID and w. MT.

7. Haplopappus lyallii Gray

Lyall's Goldenweed

Lyall's goldenweed is a dwarf perennial with a weak taproot and usually some creeping rhizomes. The mostly single stems have well-developed leaves and are less than 10 cm (4 in) tall. The basal leaves are 2-7 cm (1-3 in) long and lance-shaped, spoon-shaped, or oblong. The foliage is distinctly odorous and covered with short, glandular hairs. The small flower heads are solitary and variable in size. The subequal involucre bracts are 6-12 mm long and usually suffused with red. The 13-35 rays are 6-11 mm long.

Common in open, dry to moist habitats in the timberline and alpine zones throughout our area. B.C. to OR and NV, east to Alta. and CO.

8. Haplopappus suffruticosus (Nutt.) Gray

Shrubby Goldenweed

This plant is a small shrub up to 40 cm (16 in) tall with brittle twigs. The leaves are 1-4 cm long and lance-shaped to oblong, often with wavy margins. The herbage is glandular, occasionally hairy, and has a spicy odor. The flower heads are solitary or few-clustered at the ends of twigs. The involucre bracts are 10-16 mm long and glandular. The 3-8 rays are up to 2 cm long.

Shrubby goldenweed is uncommon on talus slopes and other open habitats in the upper subalpine and timberline zones. It has been collected on St. Joseph Peak west of Florence, the ridge north above Lost Horse Creek, and White Mountain west of Darby at 2500-2600 m (8,200-8,500 ft). OR to CA, east to MT and WY.

9. Haplopappus aberrans (A. Nels.) Hall

Idaho Goldenweed

A perennial with several stems up to 20 cm (8 in) tall, Idaho goldenweed has foliage that is glandular-hairy and odorous. The leaves have sharply toothed margins. The lower ones are narrowly elliptical, petiolate and up to 10 cm (4 in) long. The upper ones have shorter petioles and are reduced in size. The 1-few flower heads are surpassed by the subtending, leaflike bracts. The overlapping involucre bracts are about 1 cm long and glandular with sharp, green tips. Rays are absent. The disk flowers are 6-8 mm high and often reddish-orange.

Known from cliffs near Painted Rock Reservoir. Central ID and adjacent MT. (Not illustrated).

Helenium L. SneezeweedHelenium autumnale L.

Sneezeweed

Sneezeweed usually has single stems up to 1 m (39 in) tall arising from a fibrous root system. Leaves are sessile, alternate, and shallowly toothed to entire. Wing-like appendages extend down the stem from the base of the leaves. The sparingly branched, flat-topped, terminal inflorescence has few to many flower heads; these have a distinctly convex receptacle and thus appear hemispherical. Ray flowers are yellow, three-lobed, and reflexed. Disk flowers are yellow, soon turning brown.

In our area this species is exclusively riparian, always growing below the high water mark. It is common along the Clark Fork River and Bitterroot River downstream from Hamilton. From B.C. to Que., south to AZ and FL.

Sneezeweed is poisonous to livestock.

Helianthus L. Sunflower

These are coarse, annual and perennial herbs, often with tall stems. Leaves are simple, lower ones opposite, others sometimes alternate. Flower heads are showy with bright yellow ray flowers. Involucre bracts are green and herbaceous.

1. Middle stem leaves narrowly lance-shaped, opposite; moist, native habitats.....(2) H. nuttallii
1. Middle stem leaves mostly broadly lance-shaped to spade-shaped, alternate; disturbed areas.....2
2. Annual, involucre bracts abruptly contracted to a long narrow tip.....(1) H. annuus
2. Rhizomatous perennial, involucre bracts gradually tapered to a point.....(3) H. tuberosus

1. Helianthus annuus

Common Sunflower

The height of the branched stem of this common, native, annual sunflower often exceeds 1.5 m (59 in), with rough-hairy herbage. Leaves are petiolate and alternate with blades that are narrowly to broadly egg-shaped, often with heart-shaped bases. Ray flowers are bright golden yellow, and the disc flowers are darker.

The plant graces roadsides and other disturbed areas, flowering from late summer to early fall. Common sunflower is native in the western U.S. and is now widespread as a weed.

The ancestor of numerous commercial field and garden cultivars, the plant has been grown for its edible seeds since pre-Columbian times.

2. Helianthus nuttallii T. & G.

Nuttall's Sunflower

Solitary stems, often rising more than 1 m (39 in) from rhizomes with tuberous thickened roots, characterize this perennial. Short, petiolate, entire, and linear to lance-shaped leaves are rough to the touch. Usually several flower heads with yellow ray flowers are arranged in a branched, terminal inflorescence.

This is a plant of moist, often partially shaded areas. It is uncommon in our valleys occurring in riparian habitats, principally along rivers. From se. B.C. to Sask. and south to NM and AZ.



3. Helianthus tuberosus L.

Jerusalem Artichoke

An introduced perennial, spreading from tuber-bearing rhizomes. It resembles H. nuttallii, but the stem height often exceeds 2 m (6 ft), and the leaves are broadly lance-shaped, basally 3-nerved, scabrous above, and toothed on the margins with short, winged petioles. There are several to numerous flower heads on each plant.

Characteristic of moist sites and waste places, Jerusalem artichoke is generally rare in our area and the western U.S. It has persisted on some abandoned dumps of the upper Rattlesnake Valley and on a ranch in the Bitterroot Valley. It is a widespread weed of the eastern U.S.

This species has been cultivated since pre-Columbian times for its edible tubers. (Not illustrated).

Hieracium L. Hawkweed

Hawkweeds are perennial herbs with milky juice and rhizomes with fibrous roots. The leaves are alternate or all basal, entire or shallowly toothed. The often solitary, slender stems are terminated by a flat-topped or convex inflorescence or a single flowering head. Flower heads have ray florets only; they are mostly yellow, ranging to white or reddish-orange. The involucre is cylindrical to hemispheric with overlapping bracts.

- | | | |
|----|--|------------------------------|
| 1. | Basal and lower leaves small and deciduous by flowering time, middle leaves the largest..... | 2 |
| 1. | Basal and lower leaves the largest, reduced upwards..... | 3 |
| 2. | Lower stem with long, spreading hairs..... | (5) <u>H. canadense</u> |
| 2. | Lower stem lacking long, spreading hairs..... | (4) <u>H. umbellatum</u> |
| 3. | Flowers white..... | (6) <u>H. albiflorum</u> |
| 3. | Flowers yellow or orange..... | 4 |
| 4. | Flowers red-orange..... | (8) <u>H. aurantiacum</u> |
| 4. | Flowers yellow..... | 5 |
| 5. | Leaves mainly basal, glabrous or short-hairy..... | (7) <u>H. gracile</u> |
| 5. | Stem leaves apparent, usually with some long hairs..... | 6 |
| 6. | Upper stem leaves nearly glabrous..... | (3) <u>H. scouleri</u> |
| 6. | Upper stem leaves densely long-hairy..... | 7 |
| 7. | Involucre densely long-hairy, slightly or not at all glandular..... | (2) <u>H. albertinum</u> |
| 7. | Involucre moderately or sparsely long-hairy, conspicuously glandular..... | (1) <u>H. cynoglossoides</u> |

Group 1. This group includes 3 species that are closely related, very similar, and often hard to identify. Herbage ranges from scarcely to densely long-hairy. The stems are up to 1 m (39 in) tall and terminated by a branched, often many-flowered inflorescence. Leaves are entire and elongated; those of the base and lower stem are large, whereas the middle and upper ones are much reduced. All 3 species occur on dry, excessively drained soils.

1. Hieracium cynoglossoides Arv.-Touv.

Hound's Tongue Hawkweed

This hawkweed is sparsely to rather densely long-hairy, though less so than H. albertinum. The involucre is set with numerous, black, gland-tipped bristles, though never so densely covered as in H. albertinum.

Common on open to sparsely wooded, often grassy slopes, ranging from foothill elevations of 1005 m (3,300 ft) to about 2135 m (7,000 ft) on grassy "balds" in the Bitterroot Mountains. From s. B.C. and Alta. south to n. OR, UT, and WY.

In midsummer its bright yellow flowers complement the deep violet-purple ones of Aster integrifolius on open montane and subalpine slopes.

2. Hieracium albertinum Farr

Western Hawkweed

All the herbage and the involucre is conspicuously and densely long-hairy. The involucre has a dark cast due to the density of black-based, usually glandless bristles.

Most of the densely hairy rosettes noticed along trails and roads (dry open places) in the montane forests are H. albertinum. It is replaced at higher elevations by H. albiflorum and at highest elevations by H. gracile. From s. B.C. and Alta. south to ne. OR, central ID, and w. MT.; wholly east of the Cascade Range.

COMPOSITAE

3. Hieracium scouleri Hook.

Woolly-weed

This plant has sparsely long-hairy herbage below. Leaves are nearly glabrous and often glaucous above. The involucre is sparsely set with short, black, gland-tipped bristles.

H. scouleri is infrequent in dry, open woods and sagebrush slopes; not collected in subalpine habitats. Chiefly of Cascades and Sierra Nevada from s. B.C. to CA.

Group II. These 2 similar and uncommon species of moist sites are, on average, taller than species of group I. Basal and lower stem leaves are small and soon deciduous, while the others are numerous and nearly of the same size and shape. Leaves have mostly coarse and irregular teeth and are sparsely hairy at most. The few uppermost leaves, in or subtending the inflorescence, are much reduced and bract-like. The inflorescence is many-headed and flat-topped.

4. Hieracium umbellatum L.

Narrow-leaved Hawkweed

In our area, narrow-leaved hawkweed is the more common of these 2 apparently intergrading species. Narrow-leaved hawkweed is distinguished by its lack of long hairs on the lower portion of the stem.

This species is mostly found in open or partly shaded places, such as riparian shrub thickets. Circumboreal, s. in U.S. to CO, n. ID, and nw. OR.

5. Hieracium canadense Michx.

Canadian Hawkweed

The lower stem of Canadian hawkweed has evident long, spreading hairs that are absent in H. umbellatum. The leaves of H. canadense are also broader and thinner.

This plant occurs in open or shaded, moist habitats such as riparian corridors. From e. Can. to B.C. south to NJ, IA, WA, and especially MT.

Group III. This group includes three distinctly different and easily identified species.

6. Hieracium albiflorum Hook.

White Hawkweed

Stems of white hawkweed are 20-50 cm (8 to 20 in) tall with leaves that are persistent, tufted, sparingly long-hairy, and glabrous (upper stem leaves only). The inflorescence is composed of several to many small, creamy-white flower heads.

This widespread, though inconspicuous species occurs in dry, open habitats from the foothills to openings in subalpine forests. Mostly moderate elevations east of the Cascades, Yuk. to Sask., south to CA and CO.

White hawkweed flowers from June to early September, depending on elevation.

7. Hieracium gracile Hook.

Alpine Hawkweed

Alpine hawkweed is 5-25 cm (2-10 in) tall, the shortest species within Hieracium. Persistent, glabrous to short-hairy, lance-shaped to elliptical or spatula-shaped leaves are borne only at the base of slender stems. The inflorescence is formed of 1-few flower heads that are yellow, fading to creamy-white.

This plant is common on mesic sites, more so on granitic (acidic) than on calcareous substrates. It ranges from montane to alpine habitats but is most common just below or at timberline in open stands of whitebark pine and alpine larch. It is often associated with undergrowth species such as Phyllodoce spp., Vaccinium scoparium, Luzula hitchcockii, and Antennaria lanata. From AK south to CA and NM.

8. Hieracium aurantiacum L.

Orange Hawkweed

Stems rise 15-30 cm (6-12 in) from rapidly spreading stolons and rhizomes. Entire, hairy leaves are confined to a basal rosette. Showy, red-orange flower heads are crowded in a terminal cluster.

This European weed was recently introduced to Missoula from the Flathead Lake vicinity. It colonizes neglected lawns south of the Clark Fork River. (Not illustrated).

Hulsea T. & G. Hulsea

Hulsea algida Gray

Alpine Hulsea

Alpine hulsea is a strongly aromatic, densely glandular and long-hairy, stoutly taprooted perennial with stems to 25 cm (10 in) tall rising from a branched caudex. The succulent and brittle lower leaves are lance-shaped to oblong, the distal third toothed or shallowly lobed. Leaves are linear and reduced in number above. The single, large, and showy flower head is bright yellow, daisy shaped.

This species of loose granitic gravel substrates is known from five Bitterroot Mtn. summits ranging in elevation from 2650 to 3050 m (8,700 to 10,000 ft). From sw. MT to ne. OR and south to ne. NV and e. CA.

Hypochaeris L. Cat's EarHypochaeris radicata L.

Cat's Ear

Cat's ear is a weedy, fibrous-rooted perennial with stems 15-60 cm (6-24 in) tall. It resembles dandelion by having leaves in a basal rosette heads of yellow ray flowers, but it differs by having leaves with stiff, brittle-like hairs and a multiple-headed inflorescence (excepting depauperate specimens). The heads remain open in all kinds of weather.

A weed of disturbed sites only recently collected on a Missoula industrial site. Native of Europe now widely distributed in U.S.

Iva L. Poverty Weed, Marsh Elder

These are annual or perennial species with opposite leaves (or upper ones alternate). The inflorescence is composed of numerous, small heads consisting of greenish-white disc flowers that lack a pappus (modified calyx that forms a crown at summit of achene).

1. Perennial, leaves broadly linear to oblong without long petioles.....(1) I. axillaris
1. Annual, leaves spade-shaped to triangular with long petioles.....(2) I. xanthifolia

1. Iva axillaris Pursh

Poverty-weed

Poverty-weed is a perennial with an unpleasant odor and creeping rootstocks. The branched stems, to 50 cm (20 in) tall, bear sessile, oblong to linear, entire, thick and pale green leaves. Small, nodding flower heads are borne singly in the angle between stem and leaf.

This species is only locally common in our area, usually growing on disturbed sites with alkaline or high clay content (gumbo) soils. From s. B.C. to Man. and south to CA and OK.

2. Iva xanthifolia Nutt.

Marsh-elder

Marsh-elder is a robust annual, its height occasionally exceeding 1.5 m (59 in). Leaves are large, to 20 cm (8 in) long, and long-petiolate with both surfaces velvety textured, and coarsely toothed. The blade shape ranges from broadly egg-shaped to triangular or slightly heart-shaped. Flowers are sessile and borne in narrow, terminal inflorescence.

Uncommon in our area, this is a spectacularly large roadside weed of low and moist habitats. From Alta. south to e. WA, NM, and TX.

Lactuca L. Lettuce

These plants are mostly tall, alternate-leaved, leafy-stemmed annuals, biennials, or perennials with milky juice. Numerous, ligulate (all ray flowers), yellow, blue, or whitish flower heads are arranged in a narrow inflorescence. The pappus (modified calyx at apex of achene) is white to brownish.

1. Leaves prickly beneath on the midrib.....(3) L. serriola
1. Leaves not prickly beneath.....2
2. Flower heads small, involucre 9-15 mm high.....(1) L. biennis
2. Flower heads larger, involucre 15-25 mm high.....(2) L. pulchella

1. Lactuca biennis (Moench.) Fern.

Tall Blue Lettuce

Tall blue lettuce is a robust annual or biennial 0.5-2 m (20-80 in) tall. Leaves are 10-40 cm (4-16 in) long and pinnately divided and coarsely toothed. They are glabrous or hairy only on the main veins of the underside. Numerous, small flower heads have bluish, yellow, or white rays barely rising above the involucre. The pappus is brownish.

This weed occurs in moist habitats from Newf. to s. AK and south to NC, CO, and CA.

2. Lactuca pulchella (Pursh) DC.

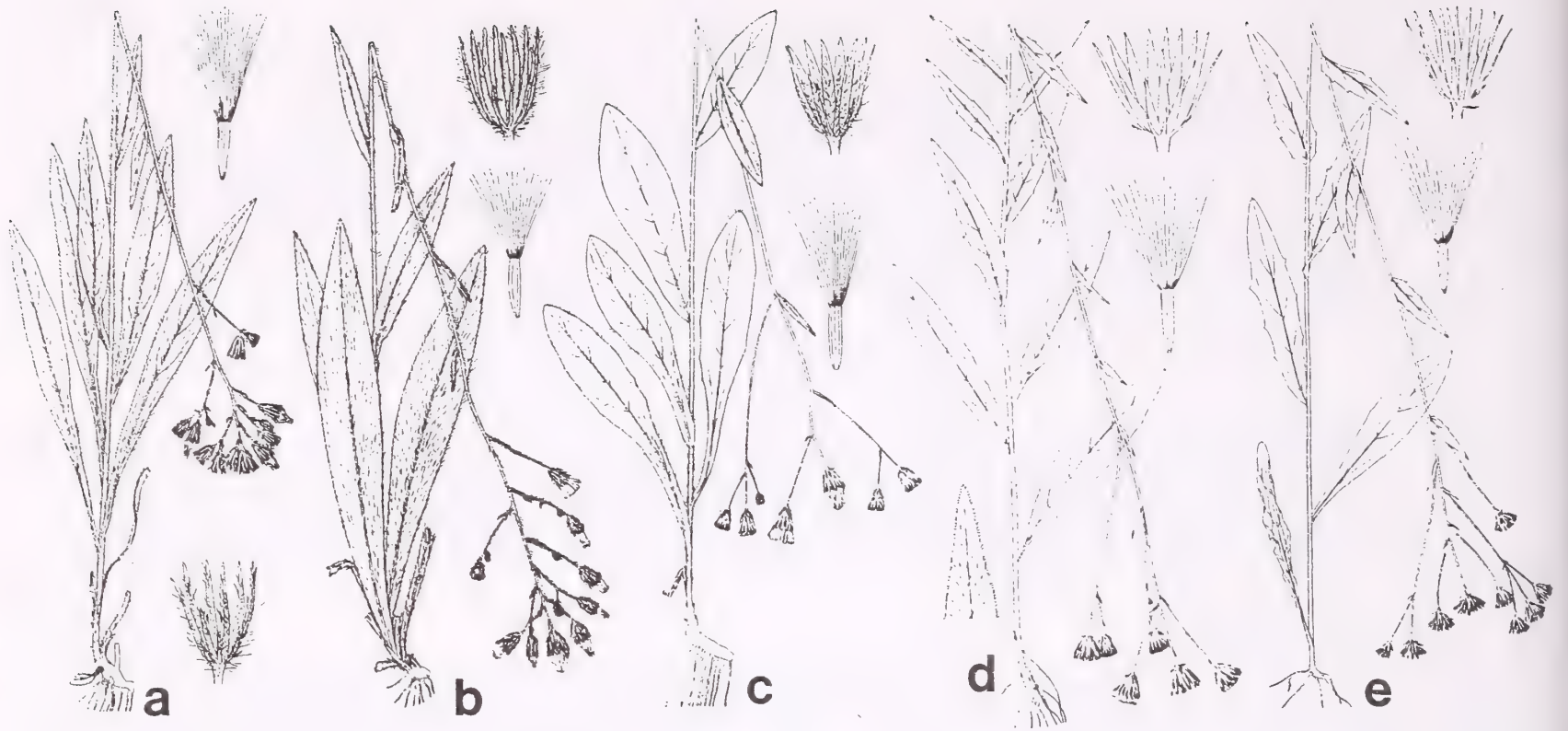
Blue Lettuce

[L. oblongifolia Nutt.]

Usually not taller than 50 cm (20 in), blue lettuce is a perennial arising from deep-seated, creeping rootstocks. Lower leaves are sessile and coarsely toothed with the teeth pointing toward the leaf base. Upper leaves are entire and progressively reduced upward. The blue ray flowers of the large heads have a white pappus.

This species is locally common in moist meadows. From AK and CA to MN and MO.

The showy flowers close in late afternoon.



a. *Hieracium cynoglossoides* b. *H. albertinum* c. *H. scouleri* d. *H. umbellatum* e. *H. canadense*
 f. *Hieracium albiflorum* g. *H. gracile* h. *Hulsea algida* i. *Hypochaeris radicata*

3. Lactuca serriola L.

Prickly Lettuce

Prickly lettuce is a winter annual or biennial up to 1.5 m (59 in) tall. The pinnately lobed, sessile, basally clasping leaves are spiny on the midrib, more finely so on the margins; the base is usually twisted orienting the blade surface vertical to the ground. The ray florets of the yellow flower heads have a white pappus.

A weed of European origin now naturalized throughout U.S. as a weed of disturbed areas (fields, gardens, clearcuts).

Lapsana L. LapsanaLapsana communis L.

Nipplewort

Nipplewort is an annual with a single, erect stem 15-150 cm (6-60 in) tall. Thin, petiolate leaves are egg-shaped to round, terminating in a blunt or rounded tip, and progressively shorter-petioled and narrowed upwards. The several to many flower heads, borne in a flat-topped inflorescence, are composed of only yellow ray flowers. Usually there are 8 relatively narrow, firm, and evidently keeled involucre bracts that remain erect at maturity.

Nipplewort is a weed of cultivated fields and disturbed areas. Native to China and Japan and established in scattered locations in the U.S.

Liatris Schreb. Gay-featherLiatris punctata Hook.

Spotted Gay-feather

The strong, glabrous stems of this perennial rise to 40 cm (16 in) from a stout rhizome. The numerous, dotted, and rigid leaves are alternate, entire, and narrowly linear. Flower heads are composed solely of tubular shaped, purple disc flowers, arranged in a crowded spikelike inflorescence.

Often associated with sandy soils, this is a common species of the Great Plains. There is 1 collection from near the Continental Divide south of Ross' Hole. Alta. and Man. south to n. Mex..

Machaeranthera Ness AsterMachaeranthera canescens (Pursh) Gray

Viscid Aster

Viscid aster is a taprooted, branched, and several-stemmed biennial or short-lived perennial 10-50 cm (4-20 in) tall. Alternate, linear to inversely lance-shaped or spatula-shaped leaves have teeth with minute spiny tips. The inflorescence has numerous small, bract-like leaves. The numerous, asterlike flowers have deep violet-purple rays and yellow to reddish disc flowers. The narrow involucre bracts have short green, reflexed or spreading tips that are occasionally suffused with red.

This species is common on dry, open slopes of the foothills. From s. B.C. to Sask and south to CO, AZ, and s. CA.

Flowering commences in June and may last to September.

Madia Mol. Tarweed

All our species are annuals possessing a tar scent of varying intensity. Leaves are narrowly linear, entire, usually opposite below, and alternate above. The inconspicuous flower heads are composed of few, relatively short and broad, yellow ray flowers. The involucre appears deeply furrowed because the bracts enfold and usually completely enclose the ray achenes. Pappus is lacking or consists of a few scales.

1. Flower heads larger; involucre greater than 5 mm high.....(2) M. glomerata
1. Flower heads small; involucre 2-5 mm high; rays minute.....2
2. Middle and upper leaves mostly alternate.....(1) M. exigua
2. Leaves mostly opposite.....(3) M. minima

1. Madia exigua (J. E. Smith) Gray

Little Tarweed

Little tarweed, a slender annual, is up to 30 cm (12 in) tall, branched above with glandular and coarsely hairy herbage. Small flower heads have short, inconspicuous rays and are borne singly on filiform, naked stalks.

This species has been collected once above the Blodgett Creek Trail in the Bitterroot Mountains. It generally occurs in open woods and grasslands of the foothills to moderate elevations in the mountains. From s. B.C., n. ID, and nw. MT, south to n. Baja Cal.

COMPOSITAE

2. Madia glomerata Hook.

Clustered Tarweed

Clustered tarweed is an erect, slender, simple-stemmed or moderately branched annual to 50 cm (20 in) tall. The dull green, densely pubescent herbage is strongly tar-scented. Leaves are linear to lance-shaped. Flower heads are borne in very small clusters at stem tips and in the angle between leaf and stem.

Typical of vernal moist, open areas, this species has been noted for many years on the banks of Lolo Creek and roadsides of Highway 12 east of Lolo Hot Springs. From B.C. to Sask., south to CA, n. AZ, and CO.

3. Madia minima (Gray) Keck

Small-head Tarweed

Spreading and mostly opposite branching distinguish this 10 cm (4 in) tall annual. The linear to linear-oblong leaves are mostly opposite. Flower heads are borne in the stem forks and in small terminal clusters.

Small-head tarweed has been collected in dry, open forests along Boulder Creek Trail and the South Fork of Lost Horse Creek at elevations ranging from 1460 to 1585 m (4,800 to 5,200 ft). From s. B.C. and n. ID, south to CA.

Matricaria L. Matricaria

These are widely introduced (now nearly circumboreal) annual or biennial herbs that most often have a branched habit and are extremely variable in size. Leaves are alternate and pinnately lobed or divided at least halfway to the midrib. The small to medium-size, terminally arranged flower heads are composed of disc or ray flowers.

- 1. Flower heads with white rays.....(2) M. maritima
- 1. Flower heads lacking rays.....(1) M. matricarioides

1. Matricaria matricarioides (Less) Porter

Pineapple-weed

Our leafy, branched, annual plants average less than 15 cm (6 in.) tall. The numerous, small, greenish-yellow, discoid (lacking ray flowers) and cone-shaped flower heads have a distinct pineapple aroma.

Pineapple-weed occurs on disturbed, nutrient poor, and shallow substrates such as roadsides and embankments. From AK to Baja Cal., east to MT and AZ, and introduced eastward.

This aromatic annual of Pacific North American origin has been introduced to northern Europe and parts of Asia.

2. Matricaria maritima L.

Scentless May-weed

Scentless may-weed is an annual or biennial up to 60 cm (24 in) tall. Leaves are 2-times pinnately divided into linear or linear-filiform segments. Ray florets are pure white and without scent.

Single plants or small populations of this European weed have been observed on both sides of the Bitterroot Valley along logging roads and in pastures and orchards. Established in e. U.S. and Can. and sparingly in the Pacific states.

This species is taller and more robust than M. matricarioides.

Microseris Don Microseris

These species are taprooted perennials with milky juice. Leaves are mostly basal, elongated, entire or pinnately divided at least halfway to midrib. Flower heads are always ligulate (only ray florets) and yellow. Involucre bracts are mostly subequal and overlapping.

This genus is distinguished from Agoseris by a rather technical character; Microseris has a pappus attached to the end of the narrow, elongated achene, whereas Agoseris spp. have the pappus attached to the achene via a relatively long, thin beak.

- 1. Plants with more or less leafy stems, often branched and having several flower heads.....(1) M. nutans
- 1. Plants lacking stem leaves, unbranched, and having single flower heads.....2
- 2. Modified calyx (pappus) of 10 to 30 slender, gradually tapering scales.....3
- 2. Pappus of 30 to 80 members, some or all of which are so narrow as to be bristles (stiff, hair-like).....(4) M. cuspidata
- 3. Leaves narrow, mostly 20-50 times as long as wide, with margins wavy or irregularly curled.....(3) M. troximoides
- 3. Leaves mostly 5-20 times as long as wide, with margins scarcely crisped or wavy.....(2) M. nigrescens



a. *Iva axillaris* b. *I. xanthifolia* c. *Lactuca biennis* d. *L. pulchella* e. *L. serriola*
f. *Lapsana communis* g. *Liatris punctata* h. *Machaeranthera canescens* i. *Madia exigua* j. *M. glomerata*

COMPOSITAE

Group I. This species has stems with sparsely distributed leaves. There may be 1-several flower heads per stem.

1. Microseris nutans (Geyer) Schultz-Bip.

Nodding Microseris

Nodding microseris is a perennial with fleshy, tuberlike roots; small forms are only 10 cm (4 in) tall. Leaves are densely clustered at the base and highly variable in shape, mostly narrowly lance-shaped or linear and entire but ranging to pinnately lobed or divided. The outer involucral bracts are much smaller than the inner.

Nodding microseris occurs chiefly in open and moist habitats from valleys upward. Small plants with a curved or decumbent base, a single flower head, and narrow, curved leaves are common on grassy, vernal moist timberline habitats, to 2620 m (8,600 ft). B.C. to CA, east to MT and CO.

Group II. These species have solitary flower heads borne on naked stalks and the leaves are densely clustered at the base.

2. Microseris nigrescens Hend.

Black-hairy Microseris

[Nothocalais nigrescens (Hend.) Heller]

This 5-30 cm (2-12 in) tall, stoutly rooted perennial differs from the others by having less crowded and wider leaves with margins that are not wavy. Involucre bracts are mostly notably three-nerved, thin-margined, egg-shaped or broadly lance-shaped and abruptly narrowed toward a fine point, and conspicuously blackish-purple dotted.

This species occurs in moist montane and subalpine meadows of the Sapphire Range; not known from the Bitterroot Mountains. From central ID to w. MT and n. WY.

3. Microseris troximoides Gray

False-agoseris

[Nothocalais troximoides (Gray) Greene]

The stem of false-agoseris rises 5-30 cm (2-12 in) above a stout root. Narrow leaves, less than 1 cm wide with wavy or crisped margins, are crowded at the base of the naked flowering stem. The lance-shaped to linear bracts generally have a dark midrib. The pappus is composed of 10-30 gradually tapering scales (not bristles).

This plant has been collected near Gibbons Pass on the north slopes of the Continental Divide. From s. B.C. south to n. CA and east of the Cascade Range to MT and UT.

4. Microseris cuspidata (Pursh) Schultz-Bip.

Toothed Microseris

[Nothocalais cuspidata (Pursh) Greene]

Toothed microseris is similar in size and habit to the above 2 species, but it differs by having a pappus composed of 30-80 bristles, not scales.

This is a species of the Great Plains that reaches the western limit of its range in our area. It occurs in our area on islands (gravelly substrates) in the lower Bitterroot River and the Clark Fork River near its confluence with the Bitterroot River.

Petasites Mill Coltsfoot

Petasites sagittatus (Banks) Gray

Sweet Coltsfoot

Sweet coltsfoot is a perennial with creeping rhizomes and thick, succulent, densely hairy stems 20-40 cm (8-16 in) tall. The large basal leaves, up to 30 cm (12 in) long, have long petioles and arrowhead-shaped blades with toothed margins. They are borne in tufts separate from the flowering stem and expand shortly flowering. Heads are composed of white or purplish ray and disk flowers. The numerous, large flower heads are arranged terminally in a dense, convex-shaped inflorescence.

Coltsfoot plant occurs in wet habitats, often where there is standing water in the spring. It can be found in willow or alder thickets such as in the meadows along the Bitterroot Rivers south of Lolo. AK to Labrador south to ne. WA, north ID, MT, and CO.

Near Missoula coltsfoot flowers in April.

Prenanthes L. Rattlesnake-root

Prenanthes sagittata (Gray) A. Nels

Rattlesnake-root

Single-stemmed and 15-50 cm (6-20 in) tall, rattlesnake-root is a perennial with milky juice. The alternate leaves are thin, and only the lower ones have wing-margined petioles and an arrowhead-shape with lobes that sometimes flare outward. Upper leaves are narrow and much reduced. The terminal

inflorescence is narrow and elongated with nodding flower heads composed of only white (fading to purple) ray flowers.

This species is locally common on shaded streambanks and other moist to wet substrates of all our mountain ranges. In the Bitterroot Mountains it occurs as high as 2225 m (7,300 ft). From s. Alta. south to n. ID and MT.

Ratibida Raf. Coneflower

Ratibida columnifera (Nutt.) Woot. & Standl.

Coneflower

Prairie coneflower, a taprooted perennial with a short caudex, usually has several branching stems up to 80 cm (32 in) tall. Leaves are alternate and pinnately divided, the segments entire and lance-shaped to linear. The several- to many-flowered heads are composed of disc and large, very broad, and reflexed ray florets. The portion of the receptacle supporting the disc flowers has the shape of a slender cone and is dull yellow at first, soon becoming dark brownish-purple.

Characteristically a plant of Great Plains prairies, coneflower has been collected on Mount Sentinel and noted spreading along highway and railroad rights-of-way. From se. B.C. south to TX and Mex. and east to MN and MO.

Rudbeckia L. Coneflower

Coneflowers are tall biennials or perennials with alternate leaves. The large flower heads have hemispheric, elongated, egg- to cone-shaped disks (central portion of the flowering head) and mostly reflexed or spreading involucre bracts.

1. Flower heads without ray.....(1) R. occidentalis
1. Ray flowers present and conspicuous.....2
2. Leaves deeply lobed.....(2) R. laciniata
2. Leaf margins entire or toothed.....(3) R. hirta

1. Rudbeckia occidentalis Nutt.

Western Coneflower

Western coneflower is a coarse perennial with densely leafy stems that are often more than 1 m (39 in) tall. Leaves are nearly glabrous, short-petiolate, broadly egg-shaped to elliptical, entire or toothed, or occasionally pinnately divided. The unique flower heads are borne on long, erect, and naked stalks and have a jet-black, cone-shaped disc up to 6 cm (2.5 in) wide at maturity.

The plant is common in moist, open to partly shaded habitats in montane and subalpine woodlands. From WA south and east to sw. MT and nw. WY, UT, and CA.

2. Rudbeckia laciniata L.

Tall Coneflower

Tall coneflower, a long-lived perennial with glabrous to glaucous foliage. It's stems are woody at the base, branched above, and up to 2 m (78 in) tall. Leaves are large, long-petiolate below to short-petiolate above, pinnately divided or cut into narrow to broad segments. The grayish to greenish or yellow disc matures to an egg-shape. Ray flowers are bright yellow and soon reflexed.

This species is found along streambanks and in other moist places. Only a few populations of tall coneflower are known in our area: along an irrigation ditch and among shrubs along the Clark Fork River near Missoula. From Que. south to FL and west to MT, s. ID, and AZ.

3. Rudbeckia hirta L.

Black-eyed Susan

The familiar black-eyed Susan is a biennial or short-lived perennial about 80 cm (32 in) tall with short-hairy herbage that is rough to the touch. Lower leaves are long-stemmed, inversely lance-shaped to elliptical, while the upper are narrow, lance-linear to oblong and predominantly sessile. Flower heads terminate long stalks and have a dark brown to purplish, hemispheric to egg-shaped disc encircled by bright orange-yellow, reflexed ray flowers.

Introduced from eastern and central North America, this species is found in disturbed areas or open meadows. A population along the lower Skalkaho Road has persisted for more than 20 years. From N.S. to FL, west to B.C., WA, and CA.

Saussurea DC. Saussurea, Sawwort

Saussurea americana Eat.

Saussurea, American Sawwort

Saussurea is a fibrous-rooted, coarse perennial with stout, erect stems up to 1 m (39 in) tall. Early in development the herbage is covered with cobwebby, tangled to woolly hairs, but with time only the



a. *Madia minima* b. *Matricaria matricarioides* c. *M. maritima* d. *Microseris nigrescens* e. *M. nutans*
f. *Microseris troximoides* g. *M. cuspidata* h. *Petasites sagittatus* i. *Prenanthes sagittata*

leaf undersides remain so. Leaves are all sharply toothed and gradually reduced upward; lower ones are petiolate, broad, and egg-shaped to triangular, whereas the upper ones are more lance-shaped and sessile. Discoid (tubular flowers only) flower heads are packed in a dense, terminal, convex-shaped inflorescence. The corolla is red-purple. As the florets mature, the white pappus becomes increasingly prominent. The inner involucre bracts overlap and are pale with dark margins, broad, and mostly acute. The outer ones are much shorter and egg-shaped.

Saussurea occurs in moist lake or headwater basins along the Selway-Bitterroot Divide and on the north slopes of the Continental Divide. It is a common and prominent member of tall herb associations ("altherbosa") with Senecio triangularis, Delphinium occidentale, and Rudbeckia occidentalis.

Senecio L. Groundsel, Butterweed

Members of this genus are often quite different from one another. They include perennial herbs and a single introduced and weedy annual. Leaves are alternate or all basal. Flower heads are mostly medium-size or small, yellow, orange, or reddish. Heads may have both disk and ray flowers or only the former. Disc florets have a pappus of white bristles. Involucre bracts are mostly herbaceous and arranged in one row, often with small bractlets at the base.

1. Plants annual weeds, rays lacking.....(14) S. vulgaris
1. Plants native perennials, rays often present.....2
2. Rays lacking.....(8) S. indecorus
2. Rays present (occasional plants in a population may be rayless).....3
3. Stem leaves reduced on the upper part of the stem; tuft of basal leaves usually present.....4
3. Stem leaves well developed, only gradually reduced upwards; tuft of basal leaves usually lacking....13
4. Leaves, at least the upper ones, lobed.....5
4. Leaves entire or toothed on the margins, not lobed.....8
5. Leaves, at least below, hairy at flowering time.....(11) S. canus
5. Leaves glabrous at flowering time.....6
6. Flower heads 1-2.....(7) S. cymbalarioides
6. Flower heads usually 3-many.....7
7. Basal leaves with a flattened or somewhat lobed base, margins deeply and sharply toothed.....(9) S. pseud aureus
7. Basal leaves tapering at the base to the petiole, margins more shallowly toothed...(10) S. pauperculus
8. Plants glabrous at flowering time.....(6) S. foetidus
8. Plants with some hairiness at flowering time.....9
9. Flower heads 1-4; involucre greater than 10 mm high.....(12) S. megacephalus
9. Flower heads usually more than 4; involucre generally less than 10 mm high.....10
10. Plants with fibrous roots from a rootcrown; herbage with long tangled white hair, often sparse at flowering time.....(3) S. integerrimus
10. Plants with an evident rhizome or horizontal caudex; herbage with denser, shorter hair.....11
11. Leaves entire; plants of dry, rocky habitats.....(11) S. canus
11. Leaves toothed or sometimes entire; plants of moist or wet meadows.....12
12. Involucral bracts with conspicuous black tips.....(4) S. lugens
12. Involucral bracts with minute black tips.....(5) S. sphaerocephalus
13. Plants usually less than 20 cm (8 in) tall.....(13) S. fremontii
13. Plants greater than 20 cm tall.....14
14. Leaves lance-shaped.....(2) S. serra
14. Leaves triangular.....(1) S. triangularis

Group I. This group includes the two tallest species. They are common and easily identified, but they do not occur together.

1. Senecio triangularis Hook.

Arrowleaf Groundsel

Arrowleaf groundsel is a several-stemmed, fibrous rooted perennial. Stem heights of low elevation plants exceed 1.5 m (59 in), but in cold timberline habitats, stems barely reach 20 cm (8 in). Herbage is

COMPOSITAE

glabrous to obscurely short-hairy. Leaves are evenly distributed, their size not much reduced upward along the stem. Lower leaves have long petioles, elongated-triangular blades with truncate or heart-shaped bases. The uppermost leaves are sessile. The terminal, flat-topped inflorescence consists of few to numerous, small, radiate, yellow-flowered heads.

Arrowleaf groundsel is especially common on, but certainly not confined to, the acidic soils of the Idaho Batholith (much of the Bitterroot Mountains). This species is diagnostic of very moist to wet forested sites and also occurs in wet meadows and riparian shrubfields. From AK to Sask. south to NM and CA.

Compared to S. serra, S. triangularis is far more common and has a wider elevational range.

2. Senecio serra Hook.

Tall Butterweed

Tall butterweed is a coarse, fibrous rooted, glabrous to minutely pubescent perennial with clustered stems that are branched above and 20-200 cm (20-78 in) tall. All leaves are normally sharply toothed. The lower ones wither early and are short petiolate and inversely lance-shaped. The others are lance-elliptical and nearly sessile above. The elongated inflorescence is broad and irregularly round-topped. Light yellow ray and disc florets and cylindrical involucre bracts comprise the small flower heads.

Known from the Sapphire Range and elsewhere but not in the Bitterroot Mountains. Tall Butterweed grows on deep, moist soils derived from neutral or calcareous rocks. WA to CA, east to MT and CO.

Group II. This group is composed of perennial plants with solitary, stout stems, and a short, thick root crown or a short, strong rhizome. All leaves are entire or toothed but never pinnately dissected or lobed. Basal and lowest stem leaves are the largest; they are petiolate, inversely lance-shaped to egg-shaped or elliptical, while the others are progressively reduced and nearly sessile. Composed of few to many flower heads, the terminal inflorescence is congested and flat-topped. The free ends of the involucre bracts are more-or-less black-tipped.

3. Senecio integerrimus Nutt.

Lambstongue Groundsel

Lambstongue groundsel is a perennial with fleshy, fibrous roots and stems that are 20-40 cm (8-16 in) tall. In the course of maturing, the herbage changes from long-hairy to nearly glabrous. Leaves are entire to irregularly toothed. The distal 1/4 of the involucral bracts is abruptly narrowed and evidently blackened.

This species occurs in all western Montana mountain ranges, from the foothills to near timberline. Habitat includes relatively dry to moist open places and open woods. It is less frequent on calcareous soils. Our variety is exaltatus (Nutt.) Cronq.; it has relatively broad involucre bracts, radiate flower heads, and bright yellow rays. From B.C. east to Sask. and south to CA.

4. Senecio lugens Rich.

Black-tipped Butterweed

This species superficially appears indistinguishable from S. integerrimus; however, the stems are generally shorter, less leafy, and arise from a short, thick rhizome. In addition, the leaves are more lance-shaped and have margins that have fine or coarse teeth that are tipped with a hardened protuberance. The black upper portion of the involucre bracts is conspicuous.

This high-elevation species is the smallest member of this group. It has only been collected at 2710 m (8,900 ft) on Ward Mtn in the Bitterroot Mountains, but occurs in moist meadows and on high open slopes of other western Montana mountain ranges. From AK and Yuk. south to n. WY and Olympic Mountains of WA.

5. Senecio sphaerocephalus Greene

Mountain-marsh Butterweed

This perennial species is fibrous rooted from a short, thin, and horizontal rhizome. It has stems to 60 cm (24 in) tall. The leaves are entire or finely toothed. The lower ones are well-developed, whereas ones of the middle and upper stem are few, short, and narrow, giving the stem a naked appearance. The black-brown involucre bract tips are much less than 1/4 the total bract length.

This species is common in the moist to wet montane meadows of the Lolo Creek drainage where its yellow flowers contrast with the blue of the camas lilies. From MT to ne. OR, south to CO and NV.

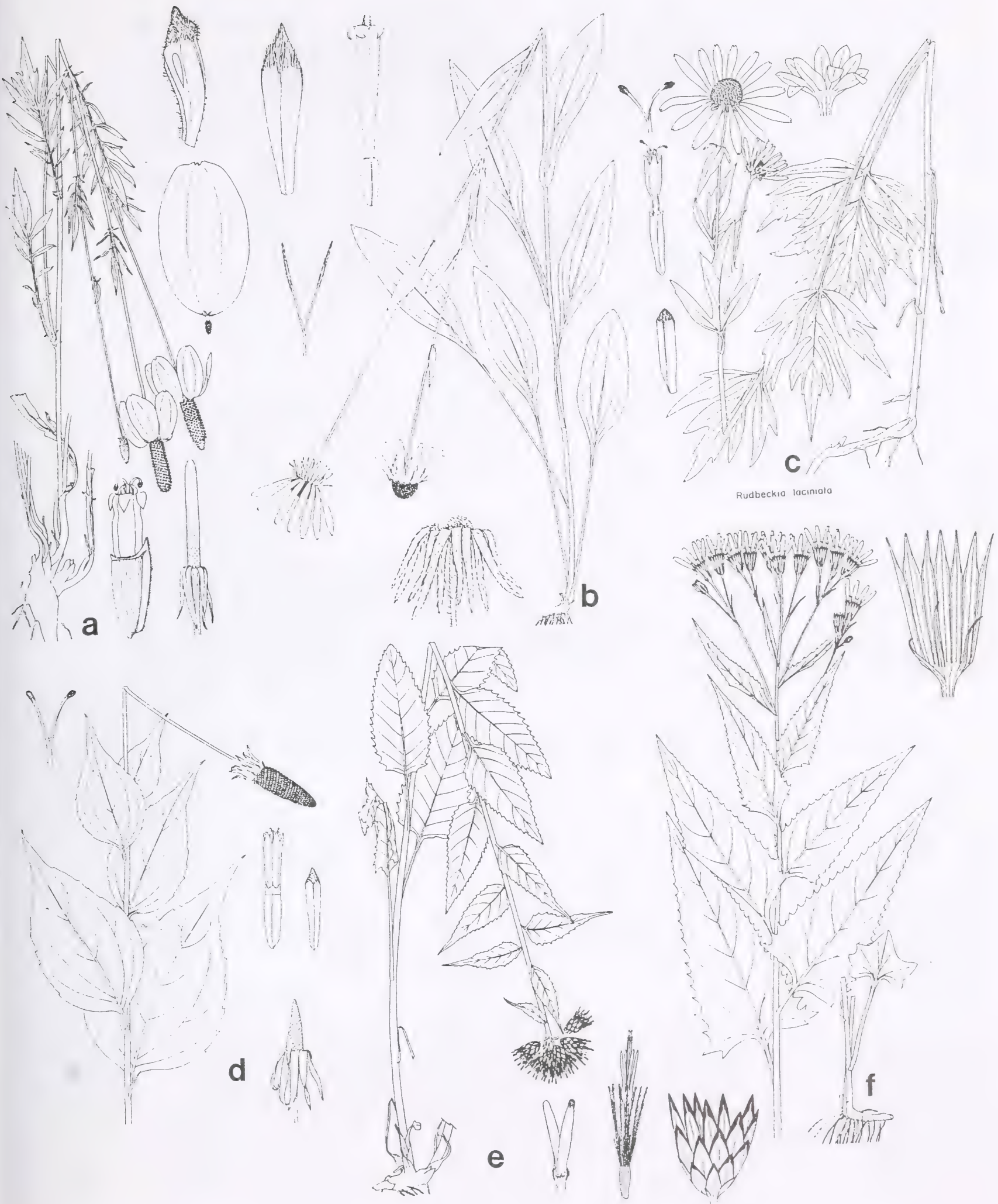
6. Senecio foetidus Howell

Sweet-marsh Butterweed

Marsh-butterweed is glabrous and fibrous rooted from a short, erect crown. Stem height may exceed 60 cm (24 in). Leaves are mostly irregularly and sharply toothed. Involucre bracts have minute black tips.

Marsh-butterweed occurs in the Sapphire Range in moist to wet, open or partly shaded places. Our variety is hydrophiloides (Rydb.) Barkley. From B.C. south to central OR and east to sw. MT.

Group III. This group includes perennial species that have short, slender stems and glabrous herbage. The lower and middle stem leaves are larger than the basal leaves. Uppermost leaves are sessile, pinnately divided or have margins cut in narrow, pointed or rounded lobes. Flower heads have both ray and disk flowers or only the latter. They are arranged in a terminal inflorescence.



a. *Ratibida columnifera* b. *Rudbeckia hirta* c. *R. laciniata* d. *R. occidentalis* e. *Saussurea americana*
 f. *Senecio triangularis*

7. Senecio cymbalarioides Nutt.

Alpine Butterweed

A solitary stem, rarely as tall as 20 cm (8 in), rises from a slender, short rhizome. Leaves are small, the basal ones nearly round or broadly inversely egg-shaped with distal, rounded teeth. The few stem leaves are reduced in size and mostly irregularly toothed or lobed. The radiate, mostly solitary flower heads are bright orange-yellow.

Alpine butterweed is common in moist to wet montane to alpine meadows and is occasionally found in moist, upper subalpine forests. From the Yukon and N.W. Terr. s. to CA and NM.

8. Senecio indecorus Greene

Rayless Mountain Butterweed

This species is fibrous rooted from a simple or branched, persistent, woody base and stem height ranges from 20 to 40 cm (8 to 16 in). The basal leaves are elliptical to inversely egg-shaped, sharply and evenly dentate or shallowly incised, and long-petiolate; all stem leaves are sharply and irregularly cut to pinnately divided (lobes again few-toothed), the uppermost sessile. Inflorescence has six to numerous, discoid (ray flowers rarely present) flower heads surrounded by purple-tipped involucre bracts.

Rayless mountain butterweed has been collected from small, wet meadows or swamps in the lower canyons of Lost Horse Creek and Rock Creek above Como Lake and occasionally noted in montane forests. From the Yuk., B.C., and Alta. south to n. WA, ID, and WY.

9. Senecio pseud aureus Rydb.

Streambank Groundsel

Streambank groundsel is 20-40 cm (8-16 in) tall and fibrous-rooted from a short rhizome or persistent, woody base. Basal leaves are relatively thin and usually truncate or nearly heart-shaped at the base. The sessile stem leaves are mostly deeply cleft to pinnately divided 1/3-2/3 of the their basal portion. The several to many heads have ray flowers.

This species is known from a few locations in the Lolo Creek drainage and in the moist meadows of the Skalkaho Basin of the Sapphire Range. Elsewhere this species is found along streambanks and in aspen groves. From B.C. to Sask. south to CA and NM.

10. Senecio pauperculus Michx.

Balsam Groundsel

Balsam groundsel is 10-40 cm (4-16 in) tall and fibrous-rooted or sometimes short stoloniferous from a short, branched, woody base. All leaves are thin and nonsucculent. The basal leaves are elliptical or nearly circular, sharp- or round-toothed to nearly entire. The stem leaves from the middle of the stem upward become pinnately divided and sessile. Flower heads are usually several and generally have ray flowers.

Balsam groundsel has been collected in meadows along the Bitterroot River south of Lolo. It is usually associated with wetlands or moist to wet forests. From B.C., Yukon, to Labrador, s. to OR, NM, to VA.

Group IV. This group includes 2 species with densely white-hairy herbage that may become partly glabrous at maturity. Both species typically occur in dry habitats.

11. Senecio canus Hook.

Silvery Groundsel

About 10-30 cm (4-12 in) tall, silvery groundsel is several-stemmed from a branched, persistent, woody base and a short taproot. Herbage is more or less white-hairy, but the upper leaf surfaces often become glabrous at maturity. The basal and lowermost stem leaves are short- or long-petiolate and mostly tufted. Leaf shape varies from normally elongated and pointed to roundish, entire, or rarely pinnately lobed. The middle and upper stem leaves are strongly reduced, approaching a bractlike condition. Few to many radiate heads comprise a dense or open convex inflorescence.

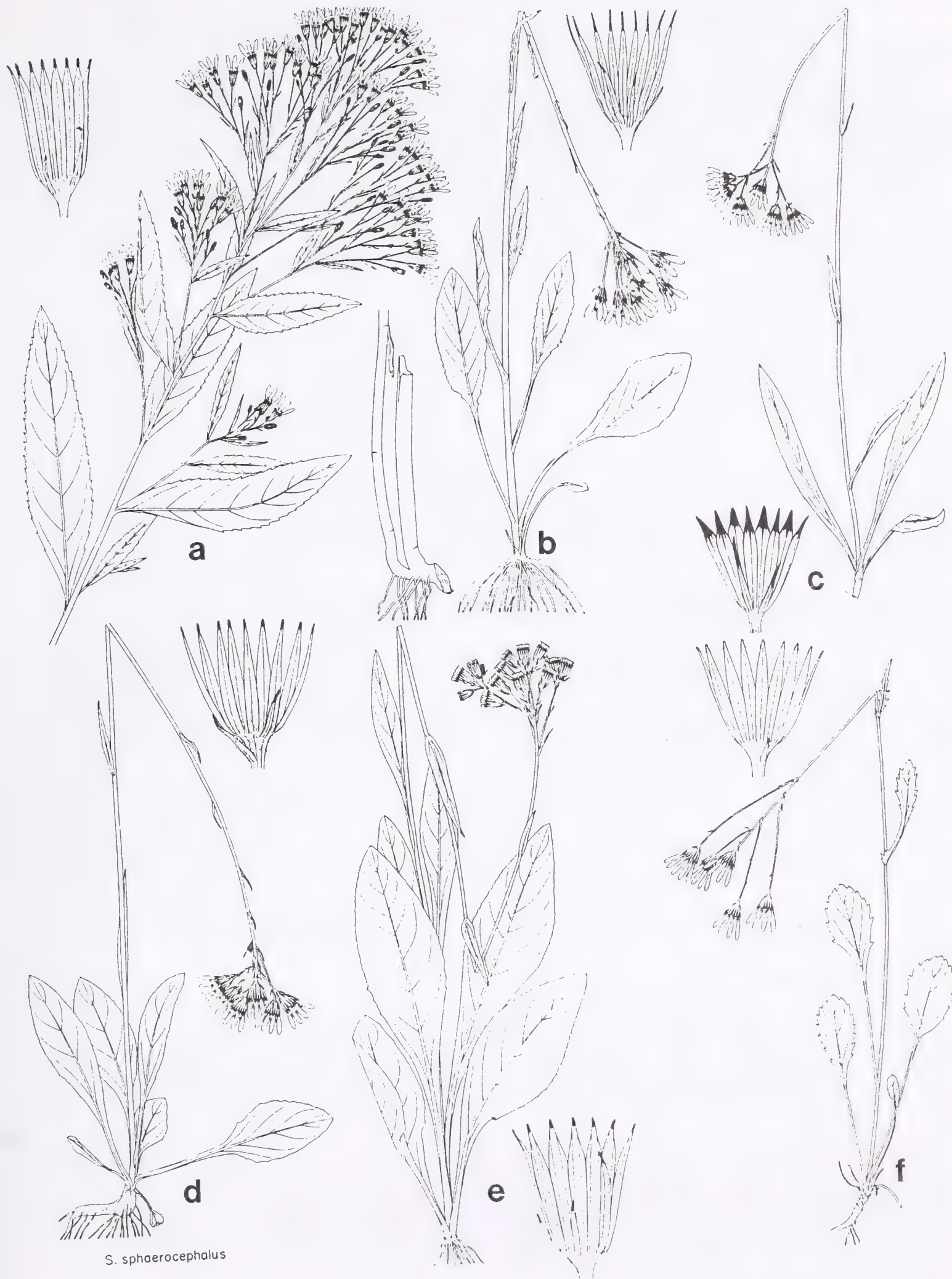
A common plant of dry exposures, including open forest, silvery groundsel occurs from valleys to alpine rocklands. It is typically associated with Eriogonum ovalifolium, cushion phlox, and Douglasia, such as on Waterworks Hill north of Missoula. From B.C. to Sask. south to CA and CO.

12. Senecio megacephalus Nutt.

Large-headed Butterweed

The stems of this species are 20-50 cm (8-20 in) tall and grow from a strong, persistent, woody stem-base or short rhizome. Plants appear silvery-gray with thin and tangled to densely flocked hairs. At maturity plants may appear green and nearly glabrous. The inversely lance-shaped to narrowly elliptical basal and lower stem leaves taper gradually to a winged petiole. Leaves of upper stem are reduced and sessile. The bright orange-yellow radiate heads are characteristically solitary, large, and showy.

This species occurs in widely scattered locations in the Bitterroot Mountains and in the Skalkaho Basin of the Sapphire Range; it always inhabits dry and sunny sites, with elevations ranging from 2380 to 2680 m (7,200 to 8,800 ft). From B.C. to Alta. south to MT and n. ID.



a. *Senecio serra* b. *S. integerrimus* c. *S. lugens* d. *S. sphaerocephalus* e. *S. foetidus*
 f. *S. cymbalarioides*

COMPOSITAE

GROUP V. This group has only one member, a truly alpine perennial.

13. Senecio fremontii T. & G.

Fremont Groundsel

Fremont groundsel is glabrous and up to 10 cm (4 in) tall. It has many stems from a persistent, woody base and taproot. Leaves are somewhat succulent, irregularly toothed, and spatula-shaped to inversely lance- or egg-shaped. Both the upper and lowermost leaves are reduced and the lower part of the stem is naked. Terminating the many branches are radiate flower heads on short naked stalks. The involucre is suffused with purple.

This high mountain species occurs in the Bitterroot Mountains, mostly on scree/talus slopes, sites that may remain moist throughout the growing season. From B.C. and s. Alta. south to CA and CO.

Group VI. This group is comprised of the only introduced, annual, weedy Senecio spp.

14. Senecio vulgaris L.

Common Groundsel

The simple, leafy stems of common groundsel are 10-40 cm (4-16 in) tall from a weak taproot. Leaves are pinnately divided or coarsely and irregularly toothed, tapering to a short petiole. The upper leaves are sessile and clasping. The numerous heads are comprised of disc florets only. The pappus (modified calyx) exceeds the length of the corolla.

This weed of disturbed areas is native to Europe but is now widespread in temperate North America.

Solidago L. Goldenrod

Goldenrods are perennials with fibrous roots from slender and elongated or short rhizomes and/or a persistent, mostly woody base. Erect, sometimes tall and rigid, stems bear alternate, simple, and toothed or entire leaves. The several to numerous, small, bright yellow flower heads have a few, short ray florets and are arranged in a terminal, showy inflorescence. Species identification is facilitated by having lower stem and underground parts for examination.

1. Plants from a short rhizome or caudex; inflorescence simple or nearly so.....2
1. Plants from long creeping rhizomes; inflorescence usually branched.....3
2. Lowermost leaves with long, straight hairs on the margins of the petioles; rays usually ca. 13.....(5) S. multiradiata
2. Lowermost leaves without long, straight hairs on the petiole margins; rays mostly 8..(6) S. spathulata
3. Leaves usually dotted with depressions or glands; rays usually more than 15.....(3) S. occidentalis
3. Leaves not dotted; rays usually less than 15.....4
4. Stems covered with small hairs below the inflorescence.....(1) S. canadensis
4. Stems glabrous below the inflorescence.....5
5. Plants usually greater than 50 cm (20 in) tall; stem leaves not much reduced upward, lower leaves usually deciduous at flowering time.....(2) S. gigantea
5. Plants mostly less than 50 cm; lower stem leaves the largest.....(4) S. missouriensis

Group I. This group includes plants that have slender rhizomes. They lack or have poorly developed basal leaves, and lower stem leaves are shed early in the growing season. Plants are tall, growing in deep and moist soil of river valleys and riparian conditions.

1. Solidago canadensis L.

Canada Goldenrod

Canada goldenrod is robust; on favorable sites its height exceeds 150 cm (60 in). Stem leaves are numerous, crowded, scarcely reduced upwards, narrowly lance-shaped to lance-elliptical, sessile, and sharply serrate to entire. Flowers are crowded into a pyramidal inflorescence with spreading or recurved branches. This species occurs on moist soil. It is often associated with species of similar height, such as snowberry, rose, thistles, nettles and tall Aster spp. Throughout U.S., s. Can, and AK.

Canada goldenrod is similar to S. gigantea, but is distinguished by having hairy stems below the inflorescence.

2. Solidago gigantea Ait.

Late Goldenrod

This plant is similar to S. canadensis but has stems with a thin waxy coating, the short-hairiness confined to the inflorescence which is recurved and bears flower heads on only one side of the branchlets.

Late goldenrod and S. canadensis occur in similar habitats but S. gigantea is much less common in our area. The variety occurring in our area is serotina (Kuntze) Cronq. B.C. to Que., south to OR, NM, and GA.



a. *Senecio indecorus* b. *S. pseudoreus* c. *S. pauperculus* d. *S. canus* e. *S. megacephalus* f. *S. fremontii*

3. Solidago occidentalis (Nutt.) T. & G.

Western Goldenrod

This species is usually more than 50 cm (20 in) and often about 180 cm (70 in) tall. It differs from the 2 species in this group by being glabrous throughout and having narrower leaves that are marked with minute translucent pits. It also has a more elongated and interrupted inflorescence.

Extensive populations occur on an island in the Clark Fork River west of Missoula and along the Bitterroot River between Hamilton and Victor. Habitats of the locations are similar, seasonally wet substrates with an overstory of willow and black cottonwood. From s. B.C. and Alta. south to CA, NM, and NE.

Group II. These species are shorter and often occur in drier habitats.

4. Solidago missouriensis Nutt.

Missouri Goldenrod

Missouri goldenrod has mostly glabrous foliage and is rhizomatous but its other characters are highly variable (4 recognized varieties), especially in the basal leaves and roots. A cluster of stems rises 20-80 cm (8-32 in) from a persistent, woody base. Basal leaves are often petiolate, inversely lance-shaped, 3-nerved, and larger than the stem leaves that are gradually much reduced upwards. The flower heads of the recurved inflorescence are arranged on 1 side of the branches.

Locally, this is the most common goldenrod of dry and open slopes, from the valleys and foothills to lower montane environments. It gives way at higher elevations to S. multiradiata. From s. B.C. and w. WA to Ont., TN, south. to TX and AZ.

5. Solidago multiradiata Ait.

Mountain Goldenrod

Stems of the mountain goldenrod are only 5-30 cm (2-12 in) tall. Leaves are inversely lance-shaped to spatula-shaped and usually toothed toward the tip but entire near the base. The most reliable character for identifying this species is the obvious stiff-haired petiole margins on the basal and lower stem leaves. The inflorescence is short and somewhat rounded at the top. In alpine environments flower heads are greatly reduced in number, but not appreciably in size.

This species is often abundant in mid-montane to timberline environments on dry, open or forested, south- or west-facing slopes. Our plants are var. scopulorum Gray. From AK and adjacent Siberia, east to Que. and south. to CA and NM.

6. Solidago spatulata DC.

Sticky Goldenrod

Stem height in sticky goldenrod ranges from 20-40 cm (8-16 in). The prominently veined basal leaves are mostly inversely lance-shaped, toothed to nearly entire, long-petioled, and persistent. Petiole length is gradually shortened and leaf size reduced toward the stem tip. The inflorescence is narrow, elongated, and pointed.

This plant is uncommon in our area. It has been collected in the Bitterroot Mountains at the 1980 m (6,500 ft) level on the south slope of Sweeney Peak. Our plants are var. neomexicana (Gray) Cronq. It occurs in a wide variety of habitats from the Yuk. to Que., south to CA, AZ, NM, and VA.

Sonchus L. Sow-thistle

All our representatives of this genus are introduced, weedy perennials and annuals with glaucous foliage. Leaves are alternate, entire to pinnately divided; leaf bases have ear-shaped lobes (auriculate) and the margins are prickly. The solitary to numerous flower heads are composed entirely of yellow ray flowers; calyx modified to a white, crisply bristled structure (pappus).

- | | | |
|----|--|--------------------------|
| 1. | Plants perennial, spreading by deep, rhizome-like roots..... | 2 |
| 1. | Plants annual from a taproot..... | 3 |
| 2. | Involucral bracts with long, stiff, glad-tipped hairs..... | (4) <u>S. arvensis</u> |
| 2. | Involucral bracts glabrous..... | (3) <u>S. uliginosus</u> |
| 3. | Lobes at the base of leaves sharp-pointed..... | (1) <u>S. oleraceus</u> |
| 3. | Lobes at the base of leaves rounded..... | (2) <u>S. asper</u> |

Group I. This group, the annual sow-thistles, includes the most common cosmopolitan weeds of fields, gardens, and waste areas. They are harmless compared to others because they are easily destroyed and, when young, eaten by livestock.

1. Sonchus oleraceus L.

Common Sow-thistle

Common sow-thistle has a stem 10-100 cm (4-40 in) tall. All leaves are softly prickly-margined, and the lower ones are pinnately divided with a terminal segment that is large and triangular to irregularly

lobed or only toothed. Upper stem leaves are sessile and clasping with large, prominent lobes at the base. The leaves are both gradually less divided and reduced upwards. Several flower heads are arranged in a terminal, nearly flat-topped inflorescence.

This species is a cosmopolitan weed native to Europe.

2. Sonchus asper (L.) Hill

Prickly Sow-thistle

Prickly sow-thistle closely resembles S. oleraceus, but the former has rounded, not acute, leaf auricles. S. asper also has leaves that are more inversely egg-shaped and toothed instead of lobed. Marginal prickles are more numerous and sharper.

This is a cosmopolitan weed native to Europe.

Group II. Taller than the annual sow-thistles, the perennial species in this group often are more than 1.5 m (60 in) tall. The bright yellow flower heads are nearly twice as wide as those of the annual species. Some perennials develop deep, vertical root systems while others have extensive, fleshy and brittle, rhizomelike roots with numerous buds.

3. Sonchus uliginosus Bieb.

Marsh Sow-thistle

Marsh sow-thistle has variable leaves, all of which are soft prickly-margined. Basal ones are narrowed to a winged petiole, pinnately divided with lobes pointing toward the leaf base. Stem leaves are sessile and clasp the stem with rounded lobes at the base. Numerous flower heads are arranged in a loose, terminal inflorescence. Involucral bracts are glabrous.

This species is found along ditches and cattail-framed bodies of stagnant water in the valleys. It is associated with Canada thistle and tall grasses. It is a widespread weed native to Europe, flowering from midsummer to first frost. (Not illustrated).

4. Sonchus arvensis L.

Field Milk-thistle

The only consistent, tangible difference between S. arvensis and S. uliginosus is the sticky-hairy involucral bracts of S. arvensis.

It is the opinion of Arthur Cronquist that S. arvensis and S. uliginosus are not distinct at the species level. S. arvensis has been collected only in the vicinity of Missoula and is believed to be uncommon in our area. East of the Continental Divide S. arvensis is the more common of these 2 species.

Stephanomeria Nutt.

Stephanomeria tenuifolia (Torr.) Hall

Slender Wire-lettuce

This is a glabrous or finely hairy perennial herb with numerous slender stems up to 70 cm (28 in) tall from a stout taproot and branched root crown. The entire or weakly toothed leaves are linear and alternate on the stem. The upper leaves are small and scalelike. The heads, borne singly on the branch tips, are composed of 4-5 pink ray flowers. The pointed involucral bracts are 7-11 mm long. Pappus is composed of white, branching bristles. The achenes are ribbed lengthwise.

Slender wire-lettuce is known from very dry habitats, often at the base of cliffs, near Painted Rocks Reservoir. B.C. to CA, east to MT and TX. (Not illustrated).

Tanacetum L. Tansy

Tanacetum vulgare L.

Common Tansy

The many rigid stems, up to 1.5 m (60 in) tall, arise from a vigorously spreading sturdy rhizome. The glabrous herbage emanates a peculiar, spicy odor. Leaves are alternate, deep green, short-petioled to sessile, deeply cleft, and deeply cut again to give a fine-toothed appearance. Small, bright yellow flower heads, composed of only disk florets, are arranged in a dense, flattened, terminal inflorescence.

An escaped species of Eurasian origin, common tansy is mostly found on disturbed sites, such as old homesteads and along fence rows and highways. It is less common in recent times due to right-of-way mowing. It is well established across most of U.S. and Can.

Taraxacum Hall. Dandelion

This genus includes introduced and native taprooted perennials with milky juice. Herbage is without hairs or may be long-hairy in parts. Leaves are elongated, entire to pinnately divided, tapering slenderly to a winged base. They form dense, basal, circularly arranged clusters (rosette) at the base of a simple, naked, and hollow, erect stem (scape). Stems are topped by solitary flower heads composed exclusively of bright yellow ray florets.



a. *Senecio vulgaris* b. *Solidago canadensis* c. *S. occidentalis* d. *S. gigantea* e. *S. missouriensis*
 f. *Solidago spathulata* g. *Solidago multiradiata* h. *Sonchus oleraceus* ,

1. Introduced plants, mostly in valley and montane zones; in disturbed areas at higher elevations.....2
1. Native species from upper subalpine to alpine.....3
2. Achenes reddish or purple at maturity; leaves usually deeply divided to the tip.....(2) T. laevigatum
2. Achenes olive or brown at maturity; leaves usually with an undivided terminal segment ca. 1/5 length of the leaf.....(1) T. officinale
3. Achenes olive or light brown; inner involucre bracts with a crown-like appendage at the tip.....(3) T. ceratophorum
3. Achenes dark brown to black; involucre bracts without crown-like appendages.....(4) T. lyratum

Group I. This group is composed of 2 very similar Eurasian weeds.

1. Taraxacum officinale Weber

Common Dandelion

Scape height of the common dandelion varies from 5-50 cm (2-20 in). Leaves are inversely lance-shaped in outline and pinnately lobed; the lobes point back toward the stem and the terminal one is the largest. The outer involucre bracts are short and bent back toward base. The inner bracts are longer, tapering to a sharp point, and upright, not becoming reflexed until the flower head matures, producing a feathery, white ball of long-beaked achenes. These are pale green or brown.

Common dandelion is a cosmopolitan weed of lawns and disturbed sites.

This species is highly regarded by beekeepers, for its early flowering. Some find the young rosettes make good salad greens.

2. Taraxacum laevigatum (Willd.) DC.

Smooth Dandelion

Smooth dandelion is distinguished from T. officinale by only a few minor features; it has more deeply dissected leaves and the segments are all about the same size. The points of the slender involucre bracts are minutely widened and the seeds are mostly reddish-brown at maturity. On the average T. laevigatum is shorter and more slender.

In our area T. officinale is the more abundant species in lawns and gardens, whereas in the mountains, at least as far up as cattle are regularly grazed, T. laevigatum is by far more common. Though rare, T. officinale was the only one of these found in alpine or timberline habitat (above Carleton Lakes at the northern end of the Bitterroot Mountains).

Group II. This group includes 2 uncommon to rare species of trans-atlantic distribution.

3. Taraxacum ceratophorum (Ledeb.) DC.

Horned Dandelion

A little less robust than T. officinale, horned dandelion has broadly winged petioles, and the leaves are less lobed than those of the other species. The outer involucre bracts are appressed, the involucre appearing smooth. The inner bracts have a small, somewhat blunt appendage at the slender tips. The seeds are straw-colored or brownish.

Associated with meadows and other moist places in the mountains, this species has been collected only once on Boulder Peak 2620 m (8,600 ft) in the Bitterroot Mountains. In the Sapphire Range it has been reported to occur in meadows with calcareous substrates. A circumboreal species, it extends south at higher elevations to NH, MA, NM, and CA.

4. Taraxacum lyratum (Ledeb.) DC.

Dwarf Alpine Dandelion

With stems less than 10 cm (4 in) tall and flower heads less than 1 cm (0.4 in) wide, dwarf alpine dandelion is the smallest of the genus. The leaves are lance-shaped in outline and deeply incised with the triangular and nearly equal lobes pointing toward the base. The involucre is smooth with few appressed and blackish outer bracts. The inner bracts rather abruptly narrow to a pointed tip. Seeds are dark brown or blackish.

This plant was collected in the Bitterroot Mountains above Chaffin Lakes Basin at 2775 m (9,100 ft) and on Trapper Peak at 2710 m (8,900 ft). Both locations were on steep and moist north-facing slopes. This species is arctic and circumpolar extending south in alpine environments to NV, AZ, and CO.

Tetradymia DC. Horse-brush

Tetradymia canescens DC.

Gray Horse-brush

Gray horse-brush is an unarmed shrub, less than 1 m (39 in) tall (mostly 20-60 cm), with foliage and twigs that are densely white- to grayish-hairy. Leaves are linear to narrow and inversely lance-shaped, with abruptly narrowed tips. Sometimes a cluster of shorter and comparatively broad leaves are borne in

COMPOSITAE

the angle between stem and larger leaves. Small, yellow disk flowers form heads that are arrayed in dense, terminal clusters on many short branches.

This is a common species of dry rangelands from B.C. south to MT, CA, and NM. In our area it occurs only on the Corvallis Big Game Winter Range and east of Victor in the foothills of the Sapphire Range.

Townsendia Hook. Townsendia

Townsendia parryi Eat.

Parry Townsendia

Parry townsendia is a taprooted biennial with 1-few stems up to 25 cm (10 in) tall. The grayish-hairy, petiolate, narrowly lance- to spoon-shaped basal leaves form a dense winter rosette that bears a flower bud in the center early in the season. The stem leaves are alternate, gradually becoming reduced upwards. They are overlapping and partially cover the whole length of the pinkish- to gray-hairy stem. The large and showy, solitary flower heads are 6-8 cm (2-3 in) in diameter and have violet- to purplish-blue ray florets and a bright yellow center of disc florets.

West of the Bitterroot River this species occurs only in the foothills, for example on Maclay Mountain at 1740 m (5,700 ft). It also occurs in scattered locations, such as open west-facing slopes, in the Sapphire Range. Parry townsendia is our largest "blue daisy"; it is an early-flowering plant of dry exposures from valleys to rather high elevations in the mountains. Alta. to ID and WY.

Tragopogon L. Salsify, Goatsbeard

Introduced from the Old World and now widely distributed in North America, salsifys are taprooted biennial herbs with milky juice. The stems are up to 1 m (39 in) tall, simple or branched. Leaves are alternate, entire, narrowly linear, and parallel veined with a clasping basal portion. Solitary flower heads composed of only pale yellow ray flowers are borne at the end of the stems. Involucre bracts are equal in length and arranged in a single series. Heads open early in the day, close at noon and remain closed on cloudy, rainy days. At maturity the plumelike bristles of the pappus form an ephemeral, whitish to tawny globe, up to 10 cm (4 in) in diameter.

1. Stem below the flowering head swollen and hollow.....(1) T. dubius
1. Stem not enlarged below the flowering head.....(2) T. pratensis

1. Tragopogon dubius Scop.

Yellow Salsify

Stem height ranges from 30-100 cm (12-40 in). Leaves are so linear and parallel veined as to resemble those of grasses. The involucre bracts extend beyond the outer rays of the flower head.

Yellow salsify is one of our most widespread and conspicuous, though harmless, introduced weeds. It is easily eradicated. Domestic and wild animals eagerly consume the young shoot and the soft taproot, taken early, is edible.

2. Tragopogon pratensis L.

Meadow Salsify

Meadow salsify is very similar to T. dubius, but the length of the ray florets is equal to or longer than that of the involucre bracts. Leaf ends are recurved or twisted, shaped approximately like pea tendrils.

Found in moister habitats than T. dubius, meadow salsify is uncommon in our area though widely established in the U.S. and Can.

Wyethia Nutt. Mule's-ear, Wyethia

Wyethia amplexicaulis Nutt.

Mule's-ear

This plant is a large, taprooted perennial up to 80 cm (32 in) tall. The basal leaves are elliptical and up to 60 cm (2 ft) long with short petioles. Stem leaves are smaller and without petioles. The herbage is glabrous and coated with a varnishlike resin. The 1-several flower heads are large with yellow rays up to 5 cm (2 in) long. The involucre bracts are broad and green.

Mule's-ear has just recently been collected in our area for the first time. It was found near Highway 93 in moist soil along a small creek just northwest of Missoula, where it may have been introduced by recent roadwork. WA to NV, east to sw. MT and CO.

Xanthium L. Cocklebur

Cockleburs are coarse annual weeds of uncertain origin, now of cosmopolitan distribution. In our area they occur infrequently on the floodplains. The stems are simple or branched. Leaves are alternate.



a. *Sonchus asper* b. *S. arvensis* c. *Tanacetum vulgare* d. *Taraxacum ceratophorum* e. *T. officinale*
 f. *Taraxacum laevigatum* g. *T. lyratum* h. *Tetradychia canescens* i. *Townsendia parryi*

CONVOLVULACEAE

Flower heads are solitary or clustered in the leaf axils. The bur (seed) has conspicuous, slender, and hooked prickles.

1. Leaves lance-shaped, tapering at the base to the petiole.....(2) X. spinosum
1. Leaves spade-shaped or triangular, flat or lobed at the base.....(1) X. strumarium

1. Xanthium strumarium L.

Common Cocklebur

Common cocklebur has stems up to 2 m (80 in). The long-petiolate leaves are quite variable in shape, usually inversely egg-shaped to nearly orbicular or broadly triangular, often shallowly lobed and having a heart-shaped base. The burs are brownish, egg-shaped to almost globe-shaped, and densely set with prickles.

Seedlings of this species are very poisonous to livestock.

2. Xanthium spinosum L.

Spiny Cocklebur

The spiny cocklebur is only 30-120 cm (1-4 ft) tall and not as robust as X. strumarium, and it has lance-shaped, entire or lobed leaves. The leaf axils are armed with conspicuous, yellow, 3-pronged spines.

This cosmopolitan weed of waste places has been found only once in Ravalli County.

CONVOLVULACEAE Morning Glory Family

Morning glories are alternate-leaved (reduced to scales in Cuscuta) plants with trailing or twining stems. The radially symmetrical flowers bear both stamens and pistils and have a 5-lobed calyx and corolla. The corolla is twisted in the bud stage. Fruits are 1- to 4-seeded capsules.

Convolvulus L. Morning Glory

Members of the genus possess no unique characters beyond those of the family.

1. Bracts linear, often somewhat removed from calyx.....(1) C. arvensis
1. Bracts broader, often heart-shaped and generally close to and concealing the calyx.....(2) C. sepium

1. Convolvulus arvensis L.

Common Bindweed

Common bindweed is a perennial, widely spreading from deep and brittle rhizomes. Stems are trailing or twining and up to 2 m (6 ft) long. White or pinkish funnel-shaped flowers are borne on long stems arising from the axils of arrowhead-shaped leaves.

Bindweed is very damaging to crop plants and difficult to eradicate. It is frequently seen on roadcuts and abandoned fields, pastures, and gardens. This European weed is well established throughout North America.

2. Convolvulus sepium L.

Hedge Bindweed

In general aspect hedge bindweed is very similar to common bindweed but it has with even longer trailing stems that bear larger flowers (petals 4-7 cm versus 1.5-2.5 cm long) subtended by broader bracts (as opposed to linear ones).

This pernicious weed has been noted immediately west and east of our area, often twining on riparian shrubs or Apocynum spp.

CORNACEAE Dogwood Family

Cornus L. Dogwood

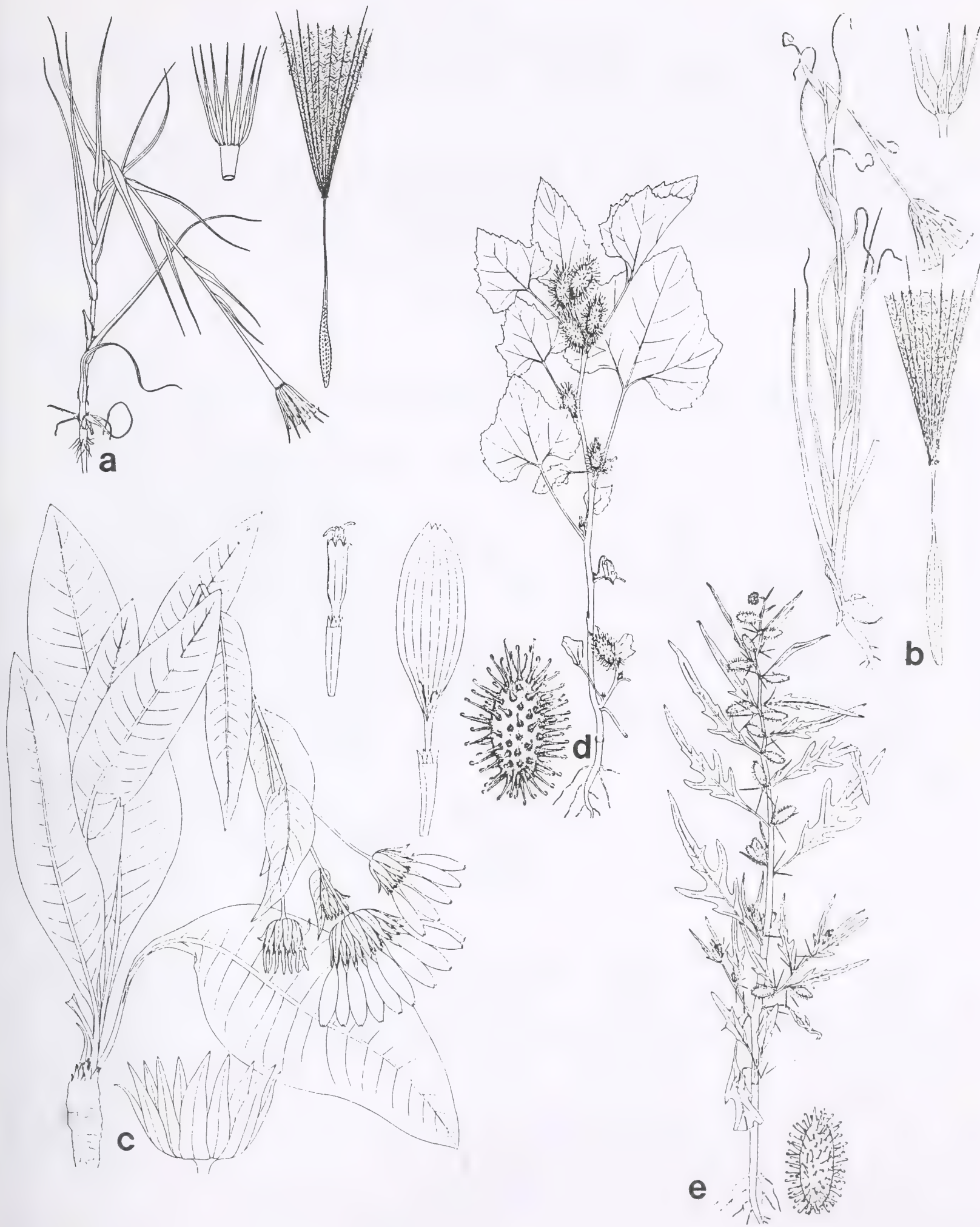
In our area, dogwoods are shrubs or semi-woody perennials. Leaves are simple, entire, opposite or whorled. Perfect flowers that mature into red or white drupes are borne in a hemispherical to nearly flat-topped inflorescence.

1. Plants herbaceous or woody only at the base, less than 20 cm (8 in) high.....(1) C. canadensis
1. Plants shrubby throughout, excepting seedling much greater than 20 cm (8 in) high... (2) C. stolonifera

1. Cornus canadensis L.

Bunchberry

Bunchberry arises from long rhizomes. It is an evergreen, trailing, and semi-woody perennial, up to 20 cm (8 in) tall, with leaves arranged in whorls on solitary stem tips. The 4 broadly egg-shaped, white and conspicuous bracts are often mistaken for petals. The true petals are actually small (only 1 mm long)



a. *Tragopogon dubius* b. *T. pratensis* c. *Wyethia amplexicaulis* d. *Xanthium strumarium* e. *X. spinosum*

CRASSULACEAE

and white or purple tinged. After flowering the bracts fall, and a cluster of bright red to orange "berries" develops to grace the purple discolored foliage.

An attractive plant, bunchberry is common in our more moist mountain and foothill forests, preferring partial shade and raw humus substrates. Bunchberry is widely distributed, partly circumboreal, found in the boreal forests and the mountains of North America.

2. Cornus stolonifera Michx.

Red Ozier Dogwood

Red ozier dogwood is a dense, multi- and red-stemmed (younger branches) shrub that spreads by the rooting of prostrate branches. The opposite leaves are mostly broadly lance-shaped. The white flowers, arranged in short flat-topped inflorescences, develop into white berries, often having a bluish cast.

Red ozier dogwood is common in our area, associated with mesic to wet conditions from river valley floodplains to subalpine meadows. After its purplish-red autumn foliage has fallen, the red branches are exhibited to best advantage. Broadly distributed across North America.

CRASSULACEAE L. Stonecrop Family

Sedum L. Stonecrop

Stonecrops are low-growing perennials with succulent stems and foliage. The simple, alternate, opposite or whorled leaves lack stipules (membranous appendages at the base of the leaf). The flat-topped, few-flowered inflorescence has yellow or reddish petals. The fruit is a dry capsule of 4-5 chambers.

1. Petals pink, purple, or greenish-purple; most leaves arrayed on flowering stem.....(4) S. roseum
1. Petals yellow (sometimes drying to pink); most leaves arranged on creeping stems or sterile shoots...2
2. Leaves of flowering stems opposite or alternate and oval, egg- to spatula-shaped or broadest beyond the midpoint.....3
2. Leaves of flowering stems alternate and linear to lance-shaped.....4
3. Leaves alternate; typically invasive on waste areas.....(5) S. acre
3. Leaves mostly opposite; mostly rocky areas in mountains.....(6) S. debile
4. Plants with a weak taproot or fibrous roots.....(3) S. leibergii
4. Plants with well developed to stout rootstocks or rhizomes.....5
5. Leaves with a sharp ridge and tapering to a slender point; upper stem leaves with bulblike flowers in their axils.....(1) S. stenopetalum
5. Leaves lacking a sharp ridge and not tapering to a point; only rarely do upper stem leaves have bulblike flowers in the axils.....(2) S. lanceolatum

1. Sedum stenopetalum Pursh.

Wormleaf Stonecrop

A glabrous perennial with numerous sterile shoots arising from rootstocks. The narrowly linear or lance-shaped leaves are strongly keeled, alternate, and minutely roughened, and gradually narrowed at the tip.

This stonecrop is common in various dry to excessively drained habitats. It is not tolerant of shade; its shadiest habitat is open ponderosa pine forests.

2. Sedum lanceolatum Torr.

Lanceleaf Stonecrop

Morphologically similar to S. stenopetalum, this species differs in having leaves that do not taper to a point and are round or nearly round in cross-section, and lack a keel.

Like the above species, lanceleaf stonecrop can thrive in dry conditions, such as rocky slopes and in soil accumulated in rock cracks. In our area lanceleaf stonecrop is common in subalpine to alpine habitats, where it is often associated with Draba spp. and Selaginella densa. It occurs in the valleys to the subalpine zone, from s. AK south to CA, CO, NM, and east to NE.

3. Sedum leibergii Britt.

Leiberg's Sedum

[S. borschii (Clausen) Clausen]

In this species, slender rootstocks produce a few weak branches with small (<5 mm long) leaves crowded into a basal rosette. Leaves at the base of and along the flowering stem are significantly larger (to 24 mm long) and less crowded than those of the rosette.

Leiberg's sedum occurs generally below 1850 m (6,000 ft) on partially shaded, steep and mossy slopes. It has been noted in the Rattlesnake Mountains and northern portion of the Bitterroot Mountains, specifically, near the mouth of McClain Creek Canyon, Big Creek Canyon, above Bass Creek Falls and in the vicinity of Kootenai Lakes. Ranges from central WA south to n.c. OR and east to w. ID and MT.



a. *Convolvulus arvensis* b. *C. sepium* c. *Cornus canadensis* d. *C. stolonifera* e. *Sedum acre*
 f. *Sedum stenopetalum* g. *S. lanceolatum*

CRUCIFERAE

4. Sedum roseum (L.) Scop.

Roseroot

[S. integrifolium (Raf.) A. Nels.]

Roseroot differs from the above species by having a thick root, thick, fleshy rootstocks, and strongly flattened but fleshy leaves up to 20 mm long. Its most distinctive feature are the brownish- to rose-red flowers crowded into small headlike cymes.

Roseroot is rare in the northern portion of the Bitterroot Mountains, known from only Sweeny Peak, but it becomes locally common on moist slopes of the high ridges south of Lost Horse Creek. This is a circumpolar arctic-alpine species inhabiting sites that are moist, at least early in the season.

5. Sedum acre L.

Wallpepper

This species is a glabrous, mat-forming perennial with stems to 10 cm (4 in) tall. The leaves, 3-5 mm long, are alternate, smooth, evergreen, and sessile. Bright yellow flowers develop into capsules with widely divergent lobes when mature.

In our area this Eurasian species is known from a collection near Woodman; it is invasive and enduring, becoming a garden pest.

6. Sedum debile Wats.

Weak-stemmed Stonecrop

Stems of this species originate from slender rootstocks and are more prostrate than those of the other species in this genus. Leaves differ by being more fleshy and conspicuously bumpy and spatula-shaped.

Weak-stemmed stonecrop has been collected at elevations above 2100 m (7,000 ft) along the Bitterroot-Selway Divide, from the moist, gravelly upper slopes of Pyramid Buttes, Ranger Peak, and south to Watchtower Pass. It ranges from central ID and se. OR to NV, east to UT and WY.

CRUCIFERAE (Brassicaceae) Mustard Family

Members of this family are annual or perennial herbs with simple or compound, alternate or basal leaves. The foliage is glabrous or pubescent with simple or (more commonly) branched or star-shaped hairs. The inflorescence is usually composed of 1-many stems bearing stalked flowers. Flowers are bisexual and cross-shaped with 4 sepals and 4 yellow, white or pinkish to purple petals (sometimes lacking). Each flower has 6 stamens, the outer 2 shorter than the inner 4. The podlike fruit consists of 2 cavities with 1-many seeds in each, separated by a thin wall (replum).

This is a large and difficult family with many similar species. Members of this family tend to be "weedy" and occur in open soil of disturbed habitats. Specimens with both flowers and mature fruits are often necessary for positive identification.

- | | | |
|----|---|-------------------|
| 1. | Fruit linear with a seedless beak >5 mm long at the tip..... | 2 |
| 1. | Fruit linear to nearly round in outline, the beak <5 mm long..... | 4 |
| 2. | Plants covered with gland-tipped hairs; petals purple..... | <u>Chorispora</u> |
| 2. | Plants without gland-tipped hairs; petals usually yellow or sometimes tinged with purple..... | 3 |
| 3. | Fruits deeply constricted between the seeds..... | <u>Raphanus</u> |
| 3. | Fruits shallowly or not at all constricted between the seeds..... | <u>Brassica</u> |
| 4. | Fruits nearly round to broadly lance-shaped in outline..... | Group A |
| 4. | Fruits linear to narrowly lance-shaped in outline..... | Group B |

Group A

- | | | |
|----|--|-------------------|
| 1. | Fruit round in outline, solitary at the tip of a leafless stem..... | <u>Idahoia</u> |
| 1. | Stems usually with >1 fruit..... | 2 |
| 2. | Leaves, at least those near the base, pinnately divided or deeply lobed..... | 3 |
| 2. | Leaves with entire or toothed margins, not deeply dissected..... | 6 |
| 3. | Fruits notched or shallowly concave on top..... | 4 |
| 3. | Fruits tapered to a rounded or pointed tip..... | 5 |
| 4. | Fruit triangular in outline..... | <u>Capsella</u> |
| 4. | Fruit elliptical to nearly round in outline..... | <u>Lepidium</u> |
| 5. | Foliage grayish with a dense covering of simple and branched hairs..... | <u>Smelowskia</u> |
| 5. | Foliage glabrous to moderately hairy, not appearing grayish..... | <u>Rorippa</u> |
| 6. | At least some of the stem leaves sessile with small lobes at the base that clasp the stem..... | 7 |
| 6. | Stem leaves without clasping lobes at the base..... | 12 |

7.	Fruits narrowly lance-shaped, the tapered end attached to the stalk.....	8
7.	Fruits more rounded in outline.....	9
8.	Fruit with a shallow notch at the top, the small style usually apparent in the notch.....	<u>Thlaspi</u>
8.	Fruit flattened or rounded on top, style not apparent.....	<u>Isatis</u>
9.	Fruit at least somewhat inflated.....	10
9.	Fruit flattened.....	11
10.	Plants annual.....	<u>Camelina</u>
10.	Plants rhizomatous perennials.....	<u>Cardaria</u>
11.	Foliage glabrous.....	<u>Thlaspi</u>
11.	Foliage hairy.....	<u>Lepidium</u>
12.	Plants glabrous; outer 2 petals larger than inner 2; uncommon introduction.....	<u>Iberis</u>
12.	Plants hairy at least near the base; petals all equal.....	13
13.	Basal leaves withered and falling as the plant matures.....	14
13.	Basal leaves conspicuous and persistent.....	17
14.	Fruit with a notch at the top.....	<u>Lepidium</u>
14.	Fruit rounded on top without a notch.....	15
15.	Fruit strongly flattened and nearly round in outline.....	<u>Alyssum</u>
15.	Fruit more elliptical or egg-shaped, not strongly flattened.....	16
16.	Leaves with entire margins.....	<u>Berteroa</u>
16.	At least the lower leaves with toothed margins.....	<u>Athysanus</u>
17.	Fruits borne on nodding stalks.....	<u>Idahoia</u>
17.	Fruits erect or spreading but not nodding.....	18
18.	Fruits lance-shaped or narrowly elliptical, higher than wide.....	19
18.	Fruits more nearly round in outline, broader than high.....	20
19.	Beak at tip of fruit (style) at least 2 mm long.....	<u>Lesquerella</u>
19.	Beak at tip of fruit <2 mm long.....	<u>Draba</u>
20.	Plants from near or above timberline in the Bitterroot Mountains.....	<u>Lesquerella</u>
20.	Plants found lower in the mountains or foothills; fruits sometimes inflated.....	21
21.	Fruits notched or lobed at the top.....	<u>Physaria</u>
21.	Fruits rounded or pointed at the tip, not notched.....	<u>Lesquerella</u>

Group B

1.	Leaves, at least those near the base, pinnately divided.....	2
1.	Leaves with entire or toothed margins.....	7
2.	Flowers white or pinkish tinged.....	3
2.	Flowers yellow.....	5
3.	Plants grayish with a dense covering of simple and branched hairs, usually tufted or mat-forming.....	<u>Smelowskia</u>
3.	Plants glabrous or hairy but not grayish or tufted.....	4
4.	Plants usually semi-aquatic with lax stems that root at the nodes.....	<u>Rorippa</u>
4.	Plants usually erect occurring in wet habitats but not aquatic.....	<u>Cardamine</u>
5.	At least some leaves with ear-like lobes at the base that clasp the stem.....	<u>Barbarea</u>
5.	Stem leaves without clasping bases.....	6
6.	Petals 2-4 mm long.....	<u>Descurainia</u>
6.	Petals 6-8 mm long.....	<u>Sisymbrium</u>
7.	Some of the leaves with ear-like lobes at the base that clasp the stem.....	8
7.	Stem leaves without clasping bases.....	9

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- 8. Fruits linear.....Arabis
- 8. Fruits lance-shaped, the tapered end attached to the stalk.....Isatis
- 9. Petals >15 mm long, purple or occasionally white.....Hesperis
- 9. Petals <12 mm long, white, yellow, or purple.....10
- 10. Fruits <8 times as long as broad.....Draba
- 10. Fruits usually >8 times as long as broad.....11
- 11. Plants annual; petals ca. 3 mm long; fruits not flattened.....Arabidopsis
- 11. Plants biennial or perennial; petals usually >4 mm long; fruits flattened.....Arabis

Alyssum L. Alyssum

These are small, annual plants with foliage that appears dull grayish due to the dense covering of star-shaped hairs. The leaves are simple and alternate. Flowers are short-stalked on the terminal portion of the stems. They have tiny, light yellow petals that quickly fade to white. The fruits are egg-shaped or round in outline with winged margins and a short style.

- 1. Fruit hairy; sepals persistent at base of mature fruit.....(2) A. alyssoides
- 1. Fruit glabrous; sepals falling as fruit develops.....(1) A. desertorum

1. Alyssum desertorum Stapf

Desert Alyssum

This species is similar to A. alyssoides but tends to be smaller and less branched. The sepals are glabrous and fall as the fruit develops. Fruits are also glabrous.

Desert alyssum is also a native of Eurasia and is the more common of the two species in our area. Widespread in W. North America.

2. Alyssum alyssoides L.

Pale Alyssum

Pale alyssum has erect stems, 5-25 cm (2-10 in) tall, that branch from the base. The entire-margined leaves are narrowly lance-shaped and 5-25 mm long. The narrow petals are 3-4 mm long. The hairy sepals are persistent around the mature fruit. Fruits are 3-4 mm long and have a dense covering of star-shaped hairs.

This Eurasian weed is often abundant in overgrazed grasslands in the valleys and foothills. Widespread throughout most of the U.S.

Arabidopsis (DC.) Schur. Cress

Arabidopsis thaliana (L.) Schur.

Thale Cress, Mouse-ear Cress

This annual plant has simple or branched stems, 10-30 cm (4-12 in) tall, that are hairy below and glabrous above. The lance- to spoon-shaped basal leaves are shallowly toothed toward the tip and covered with simple or forked hairs. Stem leaves are nearly sessile and reduced upwards. The small flowers are borne on slender, upward arching stalks on the terminal portion of the stems. The white petals are about 3 mm long. The linear fruits are held erect or spreading and are 10-15 mm long and less than 1 mm wide.

This European introduction is widespread but only locally common in our area. It has been found in gardens and in clearcuts in the subalpine zones. Widespread in much of North America.

Arabis L. Rockcress, Tower Mustard

Plants in this genus are biennial or (mostly) short-lived perennials with simple or branched stems from a taproot with a simple or branched root crown. The herbage is pubescent with simple or branched hairs or occasionally glabrous. The basal leaves have petioles and are often densely clustered in rosettes. Flowers are borne on stalks in the terminal portion of the stems. These inflorescences elongate as flowering progresses. Petals are white, pinkish, or purple. The fruits are linear with 1 or 2 rows of seeds in each of the 2 chambers.

This a very difficult group. The following key will enable correct determination of most, but not all specimens. Mature fruit is necessary.

- 1. Mature fruits held erect, ascending or at right angles to the stem.....2
- 1. Mature fruits drooping or reflexed downward.....11
- 2. Basal leaves broadly lance-shaped or elliptical in outline often held flat on the ground.....3
- 2. Basal leaves narrowly lance-shaped and more erect.....5

3. Seeds in 2 rows (at least below) in each chamber of the fruit.....(6) A. glabra
3. Seeds in a single row in each fruit chamber.....4
4. Stem leaves with small lobes at the base; fruits erect.....(3) A. hirsuta
4. Stem leaves without small lobes at the base; fruits ascending outward from the stem...(2) A. nuttallii
5. Seeds in 2 rows in each chamber of the fruit.....(9) A. drummondii
5. Seeds in a single row in each fruit chamber.....6
6. Stems with unbranched, spreading hairs at the base.....(8) A. microphylla
6. Stems glabrous or with branched hairs at the base.....7
7. Fruits densely covered with branched hairs.....(7) A. fecunda
7. Fruits glabrous.....8
8. Stems usually several from a branched root crown, mostly <30 cm (12 in) tall; plants of upper subalpine to alpine.....9
8. Stems usually single from a simple root crown, mostly >30 cm tall; plants most common in the valleys and montane zone.....10
9. Basal leaves densely hairy; fruits borne on one side of the stem (secund).....(11) A. lemmonii
9. Basal leaves usually glabrous or nearly so; fruits not secund.....(10) A. lyallii
10. Fruits straight; hairs at the base of the stem 3-branched.....(5) A. divaricarpa
10. Fruits curved; hairs at the base of the stem more freely branched.....(4) A. sparsiflora
11. Stems usually >20 cm (8 in) tall; plants mainly montane and below.....(1) A. holboellii
11. Stems usually <20 cm tall; plants subalpine and above.....(11) A. lemmonii

Group I. The species in this group are most common in the valleys and foothills, but they may also occur in the montane zone.

1. Arabis holboellii Hornem.

Holboell's Rockcress

Holboell's rockcress is a biennial or perennial with simple or branched stems up to 70 cm (28 in) tall from a simple or branched root crown. The clustered basal leaves are linear or narrowly spoon-shaped, entire or shallowly toothed, and 1-6 cm long. The lance-shaped stem leaves often have small lobes at the base. They have petioles below but may clasp the stem above. The leaves are moderately to densely covered with simple or branched hairs. Flowers are borne on short, reflexed stalks. The petals are white to (more commonly) pinkish-purple and 5-10 mm long. The straight or slightly curved, linear fruits are 3-7 cm long and 1-2 mm wide. Seeds are in a single row in each fruit chamber.

Var. pendulocarpa (Nels.) Rollins is usually less than 30 cm (12 in) tall, and the stem leaves lack lobes at the base. The fruit stalks arch downward. This is the most common variety in the open grasslands around Missoula. Var. collinsii (Fern.) Rollins has stem leaves with small basal lobes that often clasp the stem towards the top. The fruiting stalks are abruptly reflexed. This is the common variety found in open ponderosa pine forests in the foothills. Var. retrofracta (Grah.) Rydb. has stem leaves with rolled margins and densely pubescent basal leaves. The fruit stalks are abruptly reflexed. This variety is locally common in the foothills of the Sapphire Range and was once collected at 2985 m (9,800 ft) on Trapper Peak in the Bitterroot Mountains B.C. to CA, east to Que., MI, NE, and CO.

2. Arabis nuttallii Robins.

Nuttall's Rockcress

This perennial species produces 1-several slender stems up to 25 cm (10 in) tall from a simple or branched root crown. The clustered basal leaves are broadly lance-shaped, 1-4 cm long, entire-margined, and mostly glabrous on the upper surface but coarsely hairy below. The sessile stem leaves are narrowly lance-shaped and lack small lobes at the base. The flowers are borne on slender, spreading pedicels on the upper portion of the stems. Petals are white and 6-8 mm long. The narrow, flattened fruits, 12-20 mm long and 1-2 mm wide, are held nearly erect. There is a single row of seeds in each chamber of the fruit.

Nuttall's rockcress is common in moist or vernal moist soil in grasslands of the valleys and foothills, but can be found in mesic, open habitats at all elevations. WA and NV, east to Alta., MT, and WY.

Large, completely glabrous plants have been found in a moist, partially shaded site above Skalkaho Falls in the Sapphire Range.

3. Arabis hirsuta (L.) Scop.

Hairy Rockcress

Hairy rockcress is a taprooted biennial or short-lived perennial, most often with solitary, unbranched stems up to 80 cm (32 in) tall that have stiff, coarse hairs at the base but are glabrous above. The clustered basal leaves are 1-6 cm long and lance-shaped or narrowly spoon-shaped with a broad petiole



h. *Sedum debile* i. *S. leibergii* j. *S. roseum* k. *Alyssum alyssoides* l. *A. desertorum*
m. *Arabidopsis thaliana* n. *Arabis holboellii* o. *A. nuttallii* p. *A. hirsuta*

and entire or toothed margins. They may be glabrous or hairy and generally wither as the plant matures. The sessile stem leaves are lance-shaped and entire-margined with spreading lobes at the base. The inflorescence may be simple or branched. The creamy-white petals are 4-9 mm long. The linear fruits are 3-8 cm long and 1-2 mm wide and held erect and pressed close to the stem. Seeds are in a single row in each fruit chamber.

Our plants are var. pycnocarpa (Hopk.) Rollins. This species is infrequent in meadows and forest openings from the valleys up through the subalpine zones. Circumpolar, south in W. North America to CA, AZ, and NM.

4. Arabis sparsiflora Nutt.

Sicklepod Rockcress

This is a biennial or short-lived perennial with mostly simple stems up to 100 cm (40 in) tall that are densely hairy below and often glabrous above. The clustered basal leaves are 2-9 cm (1-4 in) long, densely hairy at least on the lower surface, and broadly lance-shaped with toothed margins. The slender petioles have simple, straight hairs on the margins. The numerous stem leaves are lance-shaped with small lobes at the base. Petals are 6-14 mm long and pink to reddish-purple. The narrow, strongly curved fruits, 4-12 cm (2-5 in) long and 1-2 mm wide, are borne on spreading densely hairy, down-curved stalks. Seeds are in a single row in each fruit chamber.

Our plants are var. subvillosa (Wats.) Rollins. Sicklepod rockcress is widespread and locally common in open, ponderosa pine forests but may be found up to the lower subalpine zone. B.C. to CA, east to Alta., MT, WY, and UT.

5. Arabis divaricarpa Nels.

Spreadingpod Rockcress

Spreadingpod rockcress is a biennial or short-lived perennial, usually with several simple or branched stems up to 70 cm (28 in) tall that are hairy at the base and glabrous above. The clustered basal leaves are lance-shaped or narrowly spoon-shaped, 3-6 cm (1-2 in) long, and mostly entire-margined with narrow petioles. The numerous, crowded, stem leaves are sessile and narrowly lance-shaped with small lobes at the base. The lower leaves are hairy, while the upper ones are often glabrous. The pink to reddish-purple petals are 6-9 mm long. The straight, narrow fruits, 3-8 cm (1-3 in) long and 1-3 mm wide, are held at a widely spreading, upward angle to the stem. Seeds are in 1-2 rows in each fruit chamber.

This species is widespread but infrequent in open habitats from the foothills through the subalpine zones. AK to CA, east to Alta. and CO, and the ne. U.S.

6. Arabis glabra (L.) Bernh.

Tower Mustard

Tower mustard is usually a biennial and has solitary stems up to or sometimes greater than 100 cm (40 in) tall that are usually coarsely hairy below and glabrous above. The relatively few, broadly lance-shaped, basal leaves are 3-14 cm (1-6 in) long, coarsely hairy, and have usually shallowly toothed margins with long petioles. The numerous, sessile, stem leaves are mostly glabrous, often with a thin waxy coating, and broadly lance-shaped with small lobes at the base. The sepals are glabrous, and the cream-colored petals are 5-6 mm long. The linear fruits, 6-10 cm (2-4 in) long and 1-2 mm wide, are only slightly flattened and held strictly erect. Seeds are in 2 rows (at least below) in each fruit chamber.

In our area, this introduced plant has been found only in the montane zone of the Sapphire Range near Missoula. Across s. Can., south to CA, AZ, NM, and in the Atlantic states to GA. Native to Europe.

7. Arabis fecunda Rollins

Sapphire Rockcress

This perennial rockcress has 1-few simple stems up to 30 cm (12 in) high from a simple or branched root crown. The clustered basal leaves are about 2-4 cm long and narrowly lance-shaped with entire or shallowly toothed margins and long petioles. Usually two distinct types of basal leaves can be distinguished: larger, broader ones produced in the fall and narrower ones produced in the spring. The sessile stem leaves are broadly lance-shaped and mostly entire-margined without lobes at the base. The herbage is densely covered with branched hairs. The inflorescence is densely flowered. The white petals often fade to blue and are 9-13 mm long. The narrow fruits, 3-5 cm (1-2 in) long and 1-2 mm wide, are crowded and held erect. Seeds are in a single row in each fruit chamber.

Sapphire rockcress is locally common in sparsely vegetated soil derived from highly calcareous, metamorphosed parent material in the foothills of the Sapphire Range east of Victor and Corvallis. Beaverhead, Deer Lodge, and Ravalli counties, MT.

This Montana endemic was first discovered in 1975 by Jacquelyn Cory of Hamilton. (Not illustrated).

Group II. The species in this group are most abundant in the montane to alpine zones.

8. Arabis microphylla Nutt.

Littleleaf Rockcress

Littleleaf rockcress is a perennial with 1-numerous, erect, stems, 10-70 cm (4-28 in) tall, that are finely and densely hairy at the base. The clustered basal leaves are 2-3 cm long and lance-shaped with long petioles, pointed tips, and entire or shallowly toothed margins. The numerous stem leaves are sessile with small lobes at the base. The herbage is grayish with dense, short hairs. Sepals are glabrous, and the

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pinkish to purplish-red petals are 5-8 mm long. The straight or slightly curved fruits, about 2-6 cm long and 1-2 mm wide, are held erect or slightly spreading from the stem. The seeds are in a single row in the fruit chamber.

Var. microphylla usually has several slender stems from a freely branched root crown and often fewer than 6 recurved or pendent fruits per stem. It occurs most frequently on dry open or sparsely forested slopes in the foothills of the Bitterroot Range. Var. saximontana Rollins has a sparingly branched root crown with 1-few stronger stems and 6-15 spreading or ascending fruits that are often more than twice as long as those of the other variety. It has been found above timberline on Bare Peak in the southern Bitterroot Mountains B.C. to OR, east MT and WY.

9. Arabis drummondii Gray

Drummond's Rockcress

This short-lived perennial has 1-few, usually simple stems up to 70 cm (28 in) tall. The clustered basal leaves are 2-7 cm (1-3 in) long, glabrous or sparsely hairy, and lance-shaped or narrowly elliptical with entire margins. The crowded, sessile, stem leaves are linear to narrowly lance-shaped with small lobes at the base. Sepals are glabrous and the white to purplish-pink petals are 7-12 mm long. The flattened and glabrous fruits, 3-9 cm (1-4 in) long and 2-3 mm wide, are held erect. The seeds are in two rows in each fruit chamber.

Drummond's rockcress is common in the upper subalpine and timberline zones. B.C. to CA, east to Alta. and CO, and in ne. North America.

This species appears to intergrade with A. lyallii in the Bitterroot Mountains

10. Arabis lyallii Wats.

Lyall's Rockcress

Lyall's rockcress is a tufted perennial with several erect stems, 10-25 cm (4-10 in) tall, from a branched root crown. The clustered basal leaves are 15-30 mm long and narrowly elliptical with entire margins. The several sessile stem leaves are lance-shaped with small lobes at the base. Foliage is usually fleshy, bright green and glabrous but is occasionally densely pubescent. The rose to purplish-red petals are 6-10 mm long. The glabrous fruits are 2-6 cm (1-2 in) long and held erect or spreading. Seeds are in a single row in the fruit chambers.

This is our most common alpine rockcress. It occurs in dry or mesic habitats as well as late snowmelt areas. B.C. to CA, east to Alta., UT, and WY.

Densely pubescent plants occur on St. Mary's Peak west of Stevensville.

11. Arabis lemmonii Wats.

Lemmon's Rockcress

This is a small, tufted perennial with a branched root crown and several stems up to 20 cm (8 in) tall. The clustered basal leaves, 15-20 mm long, are narrowly elliptical, petiolate, and shallowly toothed on the margins. The several sessile stem leaves are lance-shaped with small lobes at the base. The foliage has a felt-like covering of fine hairs. Petals are 4-7 mm long and lilac to rose-purple. The straight or slightly curved fruits, about 3-4 cm long and 1-2 mm wide, spread nearly horizontally on one side of the stem. Seeds are in a single row in the fruit chambers.

Our plants are var. lemmonii. Lemmon's rockcress is infrequent in subalpine areas of the Sapphire Range. B.C. to CA, east to MT and CO.

Athysanus Greene Athysanus

Athysanus pusillus (Hook.) Greene

Sandweed

This small annual has slender stems up to 25 cm (10 in) tall that branch near the base and are pubescent below with forked hairs. The lower leaves are 6-30 mm long and broadly lance-shaped with short petioles and irregularly toothed margins. The few upper leaves are smaller and sessile. Foliage has a covering of 4-branched hairs. The small flowers are well separated and borne on nodding stalks along most of the upper portion of the stems. The white petals are 1-2 mm long or sometimes lacking. The fruits, 2-3 mm long, are nearly round in outline, flattened on both sides, shallowly notched at the top, and covered with hooked hairs.

Sandweed has been found in open, vernal moist soil of sunny slopes west of Hamilton and above Como Lake in the Bitterroot Mountains B.C. to CA, east to ID and W. MT.

Barbarea R. Br. Wintercress

Members of this genus are biennial or perennial herbs with more-or-less angled, erect stems and glabrous leaves that are pinnately divided with a large rounded terminal lobe. Numerous yellow flowers are borne on short stalks on the upper portion of the stems. The long, linear fruits are 4-angled and sometimes have a small beak at the tip. Seeds are in a single row in each of the 2 chambers of the fruit.

1. Fruit with a beak at the top; basal leaves with 1 pair of lateral lobes.....(2) B. vulgaris
1. Fruit not conspicuously beaked; basal leaves with >1 pairs of lateral lobes.....(1) B. orthoceras



q. *Arabis sparsiflora* r. *A. divaricarpa* s. *A. glabra* t. *A. microphylla* u. *A. drummondii*

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1. Barbarea orthoceras Ledeb.

American Wintercress

American wintercress has mostly solitary stems up to 70 cm (28 in) tall. Basal leaves are up to 12 cm (5 in) long with short petioles and several pairs of narrow, lateral lobes and a broad, rounded terminal lobe that is toothed or entire-margined. The stem leaves have a similar shape but are mostly sessile and are reduced upwards. Flowering stems are often borne in the axils of the upper leaves. The petals are 3-5 mm long. The erect fruits, 1-5 cm long and 1-3 mm wide, are crowded in the inflorescence.

This species is common in moist, montane meadows. Circumboreal, south in w. North America to CA and NM.

Ungulates often graze these plants causing them to branch from the base and flower later in the season.

2. Barbarea vulgaris R. Br.

Yellow Rocket, Bitter Wintercress

This species is similar to B. orthoceras but is usually a larger and coarser plant. The basal leaves have a single pair of lateral lobes and an entire or weakly toothed, nearly round, terminal lobe. The stem leaves are shallowly lobed. The fruits have a small beak at the tip.

A large population of this introduced plant occurs in a moist meadow near Kelly Island along the Clark Fork River west of Missoula. Widespread in temperate North America; Eurasia.

Berteroa DC. Berteroa

Berteroa incana (L.) DC.

Berteroa

This annual species has stems up to 80 cm (32 in) tall that are branched both at the base and above. The lower leaves are broadly linear, 3-5 cm long, and entire-margined with short petioles. These wither as the plant matures. The upper leaves are smaller and sessile. The foliage is grayish with a dense covering of branched hairs. The flowers are borne on short stalks on the terminal portion of the stem. The notched petals are white and 4-6 mm long. The slightly inflated fruits are elliptical with a prominent, persistent style at the tip, 5-7 mm long. They are borne erect in a crowded inflorescence. There are 3-7 seeds in two rows in each fruit chamber.

This introduced species is generally uncommon in old fields and on roadsides in the north part of our area. WA to N.S., south to NJ, OH, OK, ID, and CA.

Brassica L. Mustard

Mustards are annual or perennial herbs with erect, branched stems and glabrous or pubescent foliage. The leaves are sessile or petiolate, and the lower ones are pinnately divided with a large, prominent terminal lobe. Flowers are stalked and borne on the terminal portion of the stems in a showy inflorescence. The petals are bright yellow. Fruits are cylindrical with a prominent beak at the tip. The seeds are nearly round and in a single row in each chamber of the fruit.

All of our species are introduced. B. kaber and B. campestris are the wild progenitors of many cultivated crops. In addition to the three species listed below, B. oleracea, a waxy-leaved species with light yellow flowers and probably a volunteer from garden-grown cabbage plants, was collected along a road near Lolo.

- 1. Beak of fruit conspicuously flattened.....(2) B. kaber
- 1. Beak of fruit round or nearly so in cross section.....2

- 2. Upper stem leaves with basal lobes that clasp the stem.....(1) B. campestris
- 2. Upper stem leaves not clasping.....(3) B. nigra

1. Brassica campestris L.

Field Mustard

Field mustard is a taprooted annual with simple or branched stems up to 100 cm (40 in) tall. The basal leaves have slender petioles and 1-2 pairs of lateral lobes and a large, egg-shaped, shallowly toothed terminal lobe. The upper stem leaves are sessile and nearly entire-margined with basal lobes that clasp the stem. Foliage is glabrous with a thin, waxy coating. The petals are 6-10 mm long. The fruits are 3-7 mm (1-3 in) long and 2-4 mm wide with a beak 1/3-1/2 as long as the body. They are ascending to spreading from the axis of the inflorescence.

This introduced species is infrequent in fields and along roads in the valleys. Widespread in much of North America, Europe.

2. Brassica kaber (DC.) Wheeler

Charlock

This species is an annual or biennial with simple or branched stems up to 80 cm (32 in) tall. The lower leaves are mostly pinnately divided with a large terminal lobe. The upper leaves are few-lobed to shallowly toothed. The plants are covered with short, stiff hairs, at least on the lower portion. The

inflorescence is usually profusely branched. Petals are 8-14 mm long. The straight or slightly curved fruits are 4-5 cm long and 2 mm broad with a flattened beak about 1/2 as long as the body. They are erect or ascending in the inflorescence.

Charlock is introduced from Europe and is infrequent in fields and along roads in our area. Widespread in North America.

This species is cultivated for the oil obtained from the seed.

3. Brassica nigra (L.) Koch

Black Mustard

Black mustard is an annual with branched stems often more than 100 cm (40 in) tall. The basal leaves are petiolate and pinnately divided with 1-2 pairs of small lateral lobes and a large terminal lobe. The sessile, upper leaves are smaller and elliptical with sharply toothed margins. The foliage is sparsely or densely covered, at least toward the base, with short, stiff hairs. Petals are usually about 5 mm long. The fruits are 10-25 mm long and 1-2 mm wide with a beak less than 1/4 the length of the body. They are held erect and appressed to the axis of the inflorescence.

This introduced species is infrequent in fields and along roads in the valleys. Widespread in North America, Europe.

Camelina Crantz False Flax

Camelina microcarpa Andrz.

Hairy False Flax

This erect, annual herb has simple or branched stems up to 70 cm (28 in) tall without a cluster of basal leaves. The lance-shaped leaves are mostly sessile and 2-8 cm (1-3 in) long with entire or toothed margins and small lobes at the base that often clasp the stem. The foliage has simple or branched hairs below and is glabrous above. The pale yellow petals are 4-5 mm long. Fruits, 5-7 mm long, are broadly elliptical in outline and rounded on top with an evident beak, and a base that tapers to a stalk longer than the fruit. The body of the fruit is inflated and wing-margined.

Hairy false flax is introduced from Europe and has become a very common weed in dry, somewhat sandy soil in the valleys. Widespread in North America.

Capsella Medic. Shepherd's Purse

Capsella bursa-pastoris (L.) Medic.

Shepherd's Purse

Shepherd's purse is an annual with mostly branched stems up to 50 cm (20 in) tall. The clustered basal leaves are 3-6 cm (1-2 in) long, petiolate, and nearly entire to pinnately lobed. The sessile stem leaves are lance-shaped with shallowly toothed margins and small lobes at the base that clasp the stem. The foliage is beset with simple, branched or star-shaped hairs. Flowers are borne on stalks that elongate in fruit. The white petals are 1-4 mm long. The fruits, 4-8 mm long, are flattened and triangular in outline with the small style persistent on the shallowly concave top. Each fruit has numerous seeds.

This is a widespread European weed, common in gardens, fields and other disturbed habitats in the valley zone. Widespread in North America.

Cardamine L. Bittercress

These are annual or perennial, mostly glabrous herbs with entire to pinnately divided leaves that are alternate and often basal. The stalked flowers are clustered or well-separated on the terminal portion of the stems. Petals are white (ours) or pink. The fruits are linear and flattened with a small but evident beak (style). The seeds are in a single row in the 2 chambers of the fruit.

1. Plants perennial with rhizomes; petals mostly 5-7 mm long.....(1) C. breweri
1. Plants annual or rarely biennial without rhizomes; petals mostly 2-4 mm long.....2
2. Lateral leaflets of stem leaves nearly linear; fruits <1.5 mm wide.....(3) C. pennsylvanica
2. Lateral leaflets of stem leaves lance-shaped to nearly round; fruits >1.5 mm broad.....(2) C. oligosperma

1. Cardamine breweri Wats.

Brewer's Bittercress

This rhizomatous perennial has erect, simple, or branching stems, 10-40 cm (4-16 in) tall, that are glabrous or slightly hairy at the base. The glabrous basal leaves are spade-shaped with long petioles. Stem leaves are mostly pinnately divided with 1-2 pairs of lateral lobes and a larger terminal lobe with wavy margins. Flowers are borne in a flat-topped inflorescence. The petals are about 5-7 mm long. The erect fruits are 2-3 cm long and 2-3 mm wide.



v. *Arabis lyallii* w. *A. lemmonii* x. *Athysanus pusillus* y. *Barbarea orthoceras* z. *B. vulgaris*
a. *Berteroa incana* b. *Brassica campestris* c. *B. kaber* d. *B. nigra* e. *Camelina microcarpa*

Var. breweri has stem leaves with the terminal lobe not distinctly toothed. It is common in subalpine wet meadows and openings in spruce-fir forests. Var. leibergii (Holz.) Hitchc. has a terminal lobe that is distinctly 7-11 toothed. It has been collected in meadows near Medicine Hot Springs, northwest of Sula. AK south to much of w. U.S.

2. Cardamine oligosperma Nutt.

Small Western Bittercress

Small western bittercress is a taprooted annual or biennial with 1-few simple or, more frequently, branched stems, 10-40 cm (4-16 in) tall, that are sparsely hairy at the base or occasionally throughout. The clustered basal leaves are pinnately compound with 2-5 pairs of nearly orbicular, lateral leaflets and a larger, shallowly lobed, terminal leaflet. Stem leaves are smaller with narrower lateral leaflets. The white petals are 2-4 mm long. The fruiting pedicels spread at an ascending angle to the stem. The erect fruits are 15-25 mm long and about 2 mm wide.

This species is common in moist or wet, open or partially shaded habitats in the valleys. AK to CA, east to Alta., CO, and NM; Siberia.

This plant seems to do best in habitats with light to moderate disturbance.

3. Cardamine pensylvanica Muhl.

Pennsylvania Bittercress

This species is a winter annual or biennial and is similar in most respects to C. oligosperma. It differs by having stem leaves with nearly linear lateral leaflets and fruits that are mostly about 1 mm broad.

Pennsylvania bittercress is a common plant in moist habitats in the valleys and often becomes a weed in gardens and greenhouses. Widespread in North America.

Cardaria Desv. White-top

The 2 members of this genus are rhizomatous perennial herbs with erect or ascending stems and simple alternate leaves. Herbage is pubescent with simple hairs. The stalked flowers are borne on the upper portion of the stems in a crowded, more-or-less flat-topped inflorescence. The fruits are egg-shaped to nearly round with a persistent style at the top.

Both species are introduced from Eurasia and are serious agricultural weeds.

1. Fruit glabrous, usually slightly concave at the base.....(1) C. draba
1. Fruit finely hairy, fruit not concave at the base.....(2) C. pubescens

1. Cardaria draba (L.) Desv.

White-top, Hoary Cress

White-top has stems that are branched above and 20-50 cm (8-20 in) tall. Basal leaves, 4-10 cm long, are lance-shaped to narrowly elliptical with coarsely toothed margins, small lobes at the base, and short, wing-margined petioles. The sessile stem leaves are similar but gradually reduced upwards. Herbage is hairy throughout. The white petals are about 3-4 mm long. The glabrous, inflated fruits are 3-5 mm long and nearly round but with both the top and bottom slightly concave.

This species is widespread and common in fertile, neutral or alkaline, disturbed soils in the valleys. Widespread in w. North America, Europe.

2. Cardaria pubescens (Mey.) Jarm.

Globepod White-top

This species is similar to C. draba, but the strongly inflated fruits are finely hairy and nearly globose without a concave base.

Globepod white-top occurs in the same habitats as C. draba but is much less common and has been found only in the northern part of our area. Widespread in much of North America, native to Eurasia.

Chorispora R. Br. Purple Mustard

Chorispora tenella (Pall.) DC.

Purple Mustard

This annual species has stems, 10-40 cm (4-16 in) tall, that branch from the base. The elliptical or lance-shaped leaves are 3-8 cm (1-3 in) long, and mostly petiolate with coarsely toothed margins. Herbage is covered with simple and gland-tipped hairs. Flowers are borne on short stalks on the upper portion of the stems. The purple petals are about 8 mm long. The narrow, curved fruits are 35-45 mm long with a 7-20 mm beak and constrictions between the seeds.

This Eurasian weed is common along roads, around farm yards, and in disturbed agricultural areas in the valleys. Widespread in the arid regions of the Pacific Northwest.



f. *Capsella bursa-pastoris* g. *Cardamine breweri* h. *C. oligosperma* i. *C. pensylvanica* j. *Cardaria draba*
 k. *Cardaria pubescens* l. *Chorisporea tenella*

Descurainia Webb & Berth. Tansy Mustard

Plants in this group are annuals or biennials with simple or branched stems and leaves that are 1-3 times pinnately divided, the terminal lobe no wider than the lateral ones. The foliage is covered with simple, branched, or short gland-tipped hairs. The small flowers are borne on stalks on the long upper portion of the stems. Petals are usually cream-colored or light yellow. The long, narrow fruits are 3-sided to nearly round in cross section. The seeds are in 1 or sometimes 2 rows in each chamber of the fruit.

These plants are somewhat "weedy" and most often occur in disturbed soil, but they are not as aggressive as many introduced species. In addition to the varieties of D. pinnata and D. richardsonii listed below, other varieties may be expected in our area.

1. Lower leaves 2-3 times pinnately divided; fruits with >20 seeds.....(3) D. sophia
1. Lower leaves mostly once pinnately divided; fruits mostly with <20 seeds.....2
2. Fruits club-shaped, rounded on top.....(1) D. pinnata
2. Fruits more linear, more gradually tapered at the tip.....(2) D. richardsonii

1. Descurainia pinnata (Walt.) Britt.

Western Tansy Mustard

Western tansy mustard is an annual with branched stems up to 60 cm (24 in) tall that lack clustered basal leaves. The lance-shaped leaves, 3-10 cm (1-4 in) long, are petiolate and pinnately divided with the primary divisions entire or toothed. Foliage is dull green and often glandular hairy. The yellow petals are 1-4 mm long. The fruits, 10-20 mm long, are somewhat rounded at the top and shorter than the ascending stalks on which they are borne.

Our plants are var. filipes (Gray) Peck. This plant is locally common in open, lightly to heavily disturbed soil of grasslands and forest openings in the valley and montane zones. Widespread in temperate North America.

2. Descurainia richardsonii (Sweet) Schulz

Mountain Tansy Mustard

This annual or biennial species has stems that are branched above and up to 100 cm (40 in) tall. The lance-shaped leaves, 2-10 cm (1-4 in) long, are 1-2 times pinnately divided into shallowly toothed ultimate lobes. Herbage is nearly glabrous to grayish with dense fine hairs and sometimes with glandular hairs. The pale yellow petals are about 1-4 mm long. The straight or slightly curved fruits, 5-17 mm long and about 1 mm wide, are contracted between the seeds and tapered to the small beak. They are borne on stalks that arch away from the stem.

Var. sonnei (Robins.) Hitchc. lacks glands on the stems and fruit stalks and is widespread but infrequent in open soil in the valley to lower subalpine zones. Var. viscosa (Rydb.) Peck is glandular and occurs more frequently in recently disturbed ground in subalpine forest. Widespread in North America.

3. Descurainia sophia (L.) Webb

Flixweed

Flixweed is an annual or biennial with stems up to 70 cm (28 in) tall that branch above and sometimes at the base. They are without a basal cluster of leaves. The petiolate, broadly lance-shaped leaves, 2-10 cm (1-4 in) long, are 2-3 times pinnately divided with narrow ultimate segments about 1 mm wide. Foliage is often grayish with a dense covering of fine hairs. The inflorescence is often 1/2 as long as the stems. The yellow petals are about 2 mm long and usually shorter than the sepals. The erect, straight or slightly curved fruits, 2-3 cm long and 1-2 mm wide, are not noticeably contracted between the seeds and are borne on short stalks that arch away from the stem.

This European introduction has been collected once near Missoula. Widespread in North America.

Draba L. Whitlow-grass, Draba

Members of this genus are annual, biennial, or perennial herbs with leafy or leafless stems and clusters of leaves at the base. Herbage is nearly glabrous to covered with simple or branched hairs. The small but often showy flowers are borne on short stalks on the terminal portion of the stems. Petals are white or a yellow that fades to white with age. The fruits are egg-shaped, elliptical, or club-shaped and sometimes twisted.

The yellow cushion-forming members of this genus are very similar, and a hand lens or microscope may be necessary for positive identification.

In addition to the species described below, plants similar to D. oligosperma in size and shape of the fruit but differing by having the leaves covered with longer, variously branched hairs are locally common near or above timberline in the Bitterroot Mountains. It is believed that these plants represent an undescribed species. They will key to either D. oligosperma or D. paysonii.

1. Flowering stems with 2-many leaves2
1. Leaves all basal; flowering stems leafless or with 1 leaf near the base.....5

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2. Upper portion of the stem and usually the flower stalks hairy.....(6) D. praealta
2. Upper portion of the stem glabrous.....3
3. Stalks of mature fruit >1.5 times as long as the fruit.....(2) D. nemorosa
3. Stalks of mature fruit <1.5 times as long as the fruits.....4
4. Leaves entire-margined.....(4) D. reptans
4. Leaves mostly toothed.....(3) D. stenoloba
5. Plants annual, without well-developed root system; petals white.....6
5. Plants biennial or short-lived perennial; petals yellow or white.....8
6. Petals deeply notched.....(1) D. verna
6. Petals not notched.....7
7. Surface of leaves densely hairy.....(4) D. reptans
7. Surface of leaves mostly glabrous.....(5) D. crassifolia
8. Petals white.....9
8. Petals yellow.....10
9. Surface of leaves densely hairy.....(11) D. lonchocarpa
9. Surface of leaves mostly glabrous.....(5) D. crassifolia
10. Surface of the leaves mostly glabrous.....(7) D. daviesiae
10. Surface of at least some of the leaves densely hairy.....11
11. Pubescence on leaf surfaces, at least in part, of hairs shaped like a comb with teeth on two sides..12
11. Hairs on leaves simple or variously branched but not double-comb shaped.....(10) D. paysonii
12. Hairs closely appressed to leaf surface; leaves mostly <1.5 mm wide.....(9) D. oligosperma
12. Hairs branching slightly above the leaf surface; leaves mostly >1.5 mm wide.....(8) D. incerta

Group I. These species are small annual plants found mainly in the valleys and open foothills.

1. Draba verna L.

Vernal Whitlow-grass

These are delicate annuals with 1-few leafless stems about 5 cm (2 in) tall although occasionally up to 20 cm (8 in). The clustered basal leaves, 10-25 mm long, are lance-shaped or narrowly spoon-shaped with entire or shallowly toothed margins. Herbage is covered with branched hairs. The inflorescence is 3- to many-flowered. The white petals are 2-3 mm long and deeply 2-lobed. The elliptical to egg-shaped fruits are glabrous and about 7 mm long.

Our plants are var. verna. Vernal whitlow-grass is widespread and locally abundant in open soil of dry grasslands in the valleys. Throughout much of North America, Eurasia.

This is one of the first plants to bloom in the spring. They flower and mature fruit very rapidly and have completely disappeared by July.

2. Draba nemorosa L.

Woods Draba

Wood draba is an annual with simple or sometimes branched stems, 5-25 cm (2-10 in) tall, that are glabrous above and beset with branched hairs below. The broadly lance-shaped leaves, 1-3 cm long, are entire or toothed on the margins and covered with simple and branched hairs. The inflorescence has 10-40 stalked flowers. The yellow petals are about 4 mm long. The elliptical to broadly lance-shaped fruits, 4-11 mm long, are beakless and glabrous or sparsely hairy. They are much shorter than the ascending stalks that bear them.

This plant is locally common in moist or vernal moist habitats in the foothills and montane zone but has also been found in open soil of subalpine meadows. B.C. to CA, east to Alta. and CO; Eurasia.

3. Draba stenoloba Ledeb.

Slender Draba

This winter annual or biennial has mostly solitary, branched stems up to 30 cm (12 in) tall that are glabrous above and hairy below. Clustered basal leaves are 1-4 cm long, covered with simple or branched hairs, and broadly lance-shaped with shallowly toothed margins. The few stem leaves are narrowly elliptical and without petioles. Numerous flowers are borne in an elongated, often branched inflorescence. The yellow petals are about 3 mm long. The oblong fruits, 8-12 mm long, are glabrous and often have a minute beak. They are usually shorter than the stalks that bear them.

Slender draba is infrequent in moist or vernal moist habitats from the valley to near timberline. AK to CA, east to Alta. and CO.

Plants observed near the Bitterroot River south of Lolo appeared to be annuals or winter annuals, while specimens collected near timberline in the Bitterroot Range southwest of Darby seemed to be biennials.

4. Draba reptans (Lam.) Fern.

Carolina Whitlow-grass

This species is an annual with stems up to 15 cm (6 in) tall that are simple or branched at the base. The clustered basal leaves are elliptical with entire margins and dense, simple or star-shaped hairs on both surfaces. The 1-2 sessile stem leaves are similar and borne near the base of the plant. Flowers are borne in a dense inflorescence at the top of the stem. The white petals are 3-5 mm long and barely exceed the sepals. The clustered, linear fruits are 5-20 mm long and held erect on short stalks.

Although common in eastern Montana, Carolina whitlow-grass is rare in our area. It was collected southwest of Missoula many years ago. Widespread in the U.S. and s. Can..

Group II. The 2 species in this group are biennials or short-lived perennials with simple or few-branched root stocks. They are found at low to high elevations in the mountains.

5. Draba crassifolia R. Grah.

Thick-leaved Draba

[D. albertina Greene]

Thick-leaved draba is a biennial or short-lived perennial with 1-several stems up to 8 cm (3 in) tall from a simple or few-branched root stock. The densely clustered basal leaves, 10-25 mm long, are linear to narrowly lance-shaped, glabrous above and sparsely hairy beneath. Stem leaves are few or lacking. The many-flowered inflorescence is more than 1/2 the height of the plant. The yellow petals fade to white and are 2-3 mm long. The glabrous fruits are lance-shaped or elliptical, 5-12 mm long, and longer than their stalks.

In our area, this plant has been found only in moist or vernal moist habitats near or above timberline in the southern Bitterroot Mountains. B.C. to CA, east to Alta. and CO.

6. Draba praealta Greene

Tall Draba

Tall draba is a biennial or short-lived perennial with 1-few, simple or usually branched stems up to 30 cm (12 in) tall. The clustered basal leaves, 10-30 mm long, are lance-shaped with entire or, more often, toothed margins. The 1-6 stem leaves are sessile and more elliptical in outline. Herbage is densely covered with a mixture of simple and branched hairs. The numerous flowers are borne in a compact inflorescence that elongates as the plant matures. The white petals are 2-4 mm long. The narrowly lance-shaped fruits, 8-14 mm long, are densely short hairy and longer than their stalks.

This species was once found in moist soil above Skalkaho Falls in the Sapphire Range east of Hamilton. B.C. to OR, east to Alta., NV and WY.

Group III. This group contains low, tufted, often cushion-forming species with branched root crowns and unbranched, leafless stems. They occur mainly near or above timberline, though some may be found in dry, open habitats lower in the mountains.

7. Draba daviesiae (Hitchc.) Rollins

Bitterroot Draba

[D. apiculata Hitchc. var. daviesiae Hitchc.]

Bitterroot draba is a low, matted plant with erect stems less than 5 cm (2 in) tall. The densely clustered basal leaves, 4-8 mm long, are lance-shaped and greenish glabrous with entire margins that are beset with short, stiff, simple hairs. The few- to 10-flowered inflorescence is nearly flat-topped in flower. The pale yellow petals are about 4 mm long. The narrowly elliptical fruits are glabrous and 3-8 mm long.

This species is endemic to the Bitterroot Mountains, where it is common in dry or vernal moist, open gravelly soil near or above timberline. In Montana it occurs from Sweeny Peak, west of Florence south to Trapper Peak southwest of Darby.

This species may occur with other drabas, but it is usually found in more mesic sites such as north and east slopes and talus fields. It can be distinguished by its greener, less hairy foliage.

8. Draba incerta Pays.

Yellowstone Draba

This is a loosely matted species with stems up to 20 cm (8 in) tall. The loosely clustered basal leaves, 7-13 mm long, are entire-margined and covered with branched hairs, some of which resemble a comb with teeth on both sides. The inflorescence is congested at first but elongates as the fruits mature. The yellow petals fade to white and are 4-5 mm long. The egg-shaped to elliptical fruits are glabrous or hairy and 6-10 mm long, about as long as their stalks.

Yellowstone draba is widespread but never abundant in dry, exposed habitats near or above timberline. B.C. and WA, east to Alta., MT, and WY.

This is the largest of the yellow-flowered, alpine, cushion drabas.



m. *Descurainia pinnata* n. *D. richardsonii* o. *D. sophia* p. *Draba verna* q. *D. nemorosa* r. *D. stenoloba*
s. *Draba reptans* t. *D. crassifolia* u. *D. praealta* v. *D. daviesiae* w. *D. incerta*

9. Draba oligosperma Hook.

Few-seeded Draba

This species is very similar to D. incerta, but it is a more compact plant with stems that are usually less than 10 cm (4 in) tall. The densely clustered basal leaves are sparsely to thickly covered with branched hairs that resemble a comb with teeth on both sides and are closely appressed to the surface of the leaf. The hairy or glabrous fruits are 2-8 mm long, shorter than their stalks.

Few-seeded draba does not occur in the Bitterroot Mountains but is infrequent on dry, open slopes of the Sapphire Range. Widespread in W. Can. and the U.S.

10. Draba paysonii Macbr.

Payson's draba

This strongly tufted and mat-forming species has stems up to 6 cm (2 in) tall. The densely clustered basal leaves are linear or narrowly lance-shaped with a raised midvein and greenish-gray with a thick covering of simple and branched hairs. The old, brown leaves are persistent at the base of the plant. The few- to 10-flowered inflorescence is nearly flat-topped in bloom. The yellow petals are 2-5 mm long. The slightly inflated fruits, 3-8 mm long, are egg-shaped with a short beak and densely covered with simple and branched hairs.

Our plants are var. treleasei (Schulz) Hitchc. Payson's draba occurs in sandy or rocky soil at about 1220 m (4,000 ft) near the Curlew Mine and in the Gash Creek drainage west of Victor. B.C. to CA, east to Alta., WY, and UT.

11. Draba lonchocarpa Rydb.

Snow Draba

Snow draba forms loose tufts or mats and has stems up to 12 cm (5 in) tall. The clustered basal leaves are linear or lance-shaped, 5-15 mm long, and densely covered with branched and star-shaped hairs. The white petals are 2-5 mm long. The linear or very narrowly lance-shaped fruits are mostly 10-20 mm long, glabrous or sparsely hairy, and often twisted.

This species is widespread but infrequent in moist microsites on north and east slopes and rock crevices near or above timberline. Snow draba is often associated with Saxifraga debilis, S. mertensiana, and Phacelia lyallii. It is rare in the northern Bitterroot Mountains but more common in the southern part. AK to OR, east to Alta., WY, and CO.

Erysimum L. Wallflower

These are annual, biennial, or perennial, taprooted herbs with simple, alternate leaves. The herbage is covered with closely appressed, forked hairs. Flowers are borne on stalks on the upper portion of the stems. The petals are yellow or orange. The fruits are linear and 4-sided in cross section with a small beak at the tip.

- | | | |
|----|---|------------------------------|
| 1. | Petals >12 mm long..... | (1) <u>E. asperum</u> |
| 1. | Petals <10 mm long..... | 2 |
| 2. | Petals 3-6 mm long; plants mostly sparsely hairy..... | (2) <u>E. cheiranthoides</u> |
| 2. | Petals 7-10 mm long; plants more grayish-hairy..... | (3) <u>E. inconspicuum</u> |

1. Erysimum asperum (Nutt.) DC.

Plains Wallflower

This biennial or, at higher elevations, short-lived perennial species has erect, simple or branched stems up to 70 cm (28 in) tall and grayish-hairy foliage. The clustered basal leaves are 3-12 cm (1-5 in) long and narrowly to broadly lance-shaped with slender petioles and entire or toothed margins. Stem leaves are similar but reduced upwards. The yellow to orange petals are 15-25 mm long. The linear fruits are 3-10 cm (1-4 in) long and 1-2 mm wide and held at a spreading angle to the stem.

Plains wallflower is common on dry exposures in foothill's grasslands and in open, sandy soils of ponderosa pine forests. It has also been found on scree near timberline on Mount Jerusalem in the southern Bitterroot Mountains. B.C. to CA, east to MN, KS, and OK.

This showy plant is one of our earliest spring wildflowers.

2. Erysimum cheiranthoides L.

Treacle Mustard

Treacle mustard is a sparsely hairy annual herb with simple or branched stems up to 70 cm (28 in) tall. They lack a distinct cluster of basal leaves. The stem leaves are up to 8 cm (3 in) long and lance-shaped with entire or finely toothed margins. The light yellow petals are 3-6 mm long. The fruits are 1-3 cm long and about 1 mm wide and nearly erect to spreading.

This species is uncommon, occurring in moist, often disturbed sites in the valleys. It has been collected along roads in the Bitterroot Valley. Widespread in North America and Eurasia.

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3. Erysimum inconspicuum (Wats.) MacM.

Small Wallflower

This species is a biennial or perennial with simple or branched stems up to 60 cm (24 in) tall and greenish to slightly grayish herbage. Both the basal and stem leaves are up to 8 cm (3 in) long and linear to narrowly lance-shaped with smooth margins. The pale yellow petals are 7-10 mm long. The linear fruits are 2-5 cm long and 1-2 mm thick and are held erect or nearly so.

Small wallflower is infrequent in dry, open, or partially shaded habitats in the foothills of the Sapphire Range. B.C. to OR, east to central Can. and U.S.

Hesperis L. Dame's Violet

Hesperis matronalis L.

Dame's Violet, Sweet Rocket

This biennial or perennial plant has 1-several simple or branched stems up to or exceeding 1 m (40 in) tall. Foliage is covered with long, simple hairs. The leaves are 5-20 cm (2-8 in) long and lance-shaped with inconspicuous teeth on the margins. Lower leaves have petioles, while the upper leaves are smaller and sessile. The stalked flowers occur on stems borne in the axils of the upper leaves. The purplish-rose to occasionally white petals are 18-25 mm long. The linear fruits, 4-10 cm (2-4 in) long, are somewhat constricted between the seeds and held nearly erect to spreading.

Dame's violet is a showy, fragrant garden plant that sometimes escapes and can be found in moist, disturbed soil in the valleys. Southern Can. and most of the U.S. Introduced from Eurasia.

Iberis L. Candytuft

Iberis amara L.

Candytuft

Candytuft is a dwarf, semi-woody, evergreen, glabrous perennial up to 40 cm (16 in) tall with several branched stems that are nearly 4-sided in cross section. The alternate, dark green, and succulent leaves are linear to lance-shaped and mostly sessile. Flowers are borne in a nearly flat-topped inflorescence that elongates as the plant matures. The white petals are of 2 sizes, the outer larger than the inner. The flattened fruits have netlike nerves on the face and are egg-shaped with winged margins and a deep notch at the tip in which the persistent style is borne.

This introduced garden escape has persisted for several years above Warm Springs Creek in the southern Bitterroot Mountains. Native to Europe and infrequent in North America.

Idahoia Nels. & Macbr. Scalepod

Idahoia scapigera (Hook.) Nels. & Macbr.

Scalepod

Scalepod is a small, glabrous annual with slender leafless stems up to 12 cm (5 in) tall that arch upward at the base. The clustered basal leaves have long petioles and egg-shaped blades, 5-15 mm long, that are entire or with a pair of lobes at the base. Flowers are solitary at the tips of the stems. The white petals are about 2 mm long and fall quickly after blooming. The round fruit is flat, 6-12 mm long, and wing-margined.

In Montana this species is known only from vernal moist, open soil on a south-facing slope at the mouth of Blodgett Canyon west of Hamilton. WA to CA, east to MT, ID and NV.

Isatis L. Dyer's Woad

Isatis tinctoria L.

Dyer's Woad

Dyer's woad is a biennial or perennial with usually solitary, branched stems up to about 1 m (40 in) tall that are glabrous with a thin, waxy coating. The clustered basal leaves, up to 18 cm (7 in) long, have long petioles and lance-shaped blades with shallowly toothed margins. The sessile stem leaves are lance-shaped to elliptical with small lobes at the base that clasp the stem. Foliage is sparsely covered with simple hairs. The stalked flowers occur on the terminal portions of numerous branches of the inflorescence. The bright yellow petals are 3-4 mm long. The lance-shaped, wing-margined fruits are 12-18 mm long and are pendulous on reflexed stalks that are swollen where they connect the fruit.

This introduced species has persisted for many years on the lower southwest slope of Mount Sentinel above the university campus in Missoula. Widespread in temperate North America.

This European plant was formerly cultivated as a source of blue dye.

Lepidium L. Pepper Grass

Members of this genus in our area are annual or biennial herbs with simple or branched stems and simple or 1-3 times pinnately divided, sessile or petiolate, alternate and basal leaves. Flowers are



x. *Draba oligosperma* y. *D. paysonii* z. *D. lonchocarpa* a. *Erysimum asperum* b. *E. cheiranthoides*
c. *Erysimum inconspicuum* d. *Hesperis matronalis* e. *Idahoia scapigera* f. *Isatis tinctoria*

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borne on stalks on the upper portion of the stems. These inflorescences are compact at first but elongate as the plant matures. The small petals are white, yellow, or greenish. Fruits are nearly round to narrowly elliptical with a wing-margined and notched tip. They are flattened at right angles to the partition that separates the 2 seed chambers.

All of our species are "weedy" and occur mostly in disturbed habitats.

1. Base of upper stem leaves clasping or wrapping around the stem.....2
1. Base of stem leaves not clasping or wrapping around the stem.....3
2. Upper stem leaves with bases that wrap around the stem.....(2) L. perfoliatum
2. Stem leaves with bases that clasp the stem but are not wrapped around it.....(3) L. campestre
3. Petals 1-3 mm long.....(4) L. virginicum
3. Petals <1 mm long or lacking.....4
4. Fruits widest above the middle; common.....(1) L. densiflorum
4. Fruits widest at or below the middle; rare.....(5) L. ramosissimum

1. Lepidium densiflorum Schrad.

Common Pepper Grass

Common pepper grass is an annual with branching stems up to 50 cm (20 in) tall with finely hairy herbage. The loosely clustered basal leaves, 3-10 cm (1-4 in) long, are narrowly lance-shaped and pinnately lobed but are mostly withered by flowering time. The smaller stem leaves are narrowly lance-shaped or nearly linear with entire or toothed margins. The whitish petals are up to 1 mm long or lacking. The glabrous fruits are oblong to egg-shaped, about 3 mm long and narrowly margined with a small notch at the tip.

Our plants are var. macrocarpum Mull. Our most common pepper grass occurs in dry, open habitats throughout the valleys and foothills. Widespread in North America and Eurasia.

2. Lepidium perfoliatum L.

Clasping Pepper Grass

This is an annual with branching stems up to 40 cm (16 in) tall with herbage that is sparsely hairy below and glabrous above. Basal leaves are 2-3 times pinnately divided into linear segments. The lower stem leaves are once pinnately lobed, and the sessile upper leaves are spade-shaped and entire-margined with the base completely surrounding the stem. The yellowish petals are 1-2 mm long. The fruit stalks are longer than the glabrous to sparsely hairy fruits that are egg-shaped with an inconspicuous notch at the tip.

Clasping pepper grass is common in dry or vernal moist, often heavy soil of roadsides and disturbed grasslands in the valleys and foothills. A native of Europe, widely distributed in North America.

3. Lepidium campestre (L.) R. Br.

Field Pepper Grass

This species is an annual with simple or branched stems up to 50 cm (20 in) tall with densely soft-hairy, grayish foliage. The loosely clustered basal leaves, 4-12 cm (2-5 in) long, are lance-shaped with mostly entire margins and long petioles. The numerous, sessile, stem leaves are broadly lance-shaped with minutely toothed margins and small lobes at the base that clasp the stem. The white petals are 2-3 mm long. The glabrous or pubescent fruits are 5-6 mm long and egg-shaped with narrow winged margins and a slightly notched tip.

A European introduction, field pepper grass is uncommon in dry, open, disturbed soil in the valleys. Widespread in most of the U.S.

4. Lepidium virginicum L.

Virginia Pepper Grass

A freely branched annual, Virginia pepper grass is 15-50 cm (6-20 in) tall with foliage that is sparsely hairy towards the base and glabrous above. The lower leaves, 5-15 cm (2-6 in) long, are broadly lance-shaped with deeply toothed or lobed margins. Upper leaves are linear and entire-margined. The inflorescence consists of numerous, elongated, flowering stems in the axils of the upper leaves. The white petals are 1-3 mm long, longer than the sepals. The broadly elliptical fruits, 2-4 mm long, have a very shallow notch at the apex and are shorter than their stalks.

Our plants are var. pubescens (Greene) Hitchc. This species has been collected near Missoula. Widespread in much of temperate North America.

5. Lepidium ramosissimum Nels.

Branched Pepper Grass

Branched pepper grass is a biennial or occasionally an annual with profusely branched stems up to 50 cm (20 in) tall with finely hairy foliage. Basal leaves are pinnately divided with toothed lobes. The upper stem leaves are smaller and lance-shaped to linear with entire or toothed margins. The inflorescence consists of numerous short flowering stems in the axils of the upper leaves and a longer

terminal stem. The white petals are less than 1 mm long, shorter than the sepals. The elliptical fruits, 2-4 mm long, are wing-margined, shallowly notched at the apex, and about as long as their stalks.

This species was once collected near Missoula. Man. to Alta., south to ND and NM.

Lesquerella Wats. Bladderpod

Members of this genus are low perennial (ours) herbs with short, prostrate or ascending stems, and simple, alternate and basal leaves that are covered with appressed, star-shaped hairs. The showy flowers have yellow petals that are longer than the sepals. The nearly round to oblong fruits are compressed or inflated with a slender persistent style at the apex.

Lesquerella and Physaria are very similar and species of one genus could be mistaken for a member of the other.

1. Fruit higher than wide, pointed at the tip; montane and below.....(1) L. alpina
1. Fruit wider than high, shallowly notched at the tip; near or above timberline.....(2) L. humilis

1. Lesquerella alpina (Nutt.) Wats.

Alpine Bladderpod

Alpine bladderpod forms small tufts with erect or ascending stems, 10-15 cm (4-6 in) long, from a simple or branched root crown. The densely clustered basal leaves, 5-40 mm long, are linear to narrowly lance-shaped with entire margins. Stem leaves are similar but smaller. The few, stalked flowers are borne at the ends of stems that barely protrude above the basal leaves. The egg- to lance-shaped fruits, about 4-5 mm long, are inflated at the base and compressed toward the top. They are borne on spreading, straight to S-shaped stalks.

This species is infrequent in dry, open soil in the foothills of the Sapphire Range. Alta. to CO, east to Sask, ND, and NE.

2. Lesquerella humilis Rollins

Bitterroot Bladderpod

This is a tufted perennial with 1-several prostrate stems, 2-5 cm long, from a simple root crown that is covered with old, dry, leaf bases. The clustered basal leaves, 15-25 mm long, have petioles and blades that are broadly elliptical with entire margins. The 3-6 stem leaves are narrowly spoon-shaped. Foliage appears silvery with a dense covering of closely appressed hairs. The 3-5 flowers have yellowish sepals and bright yellow petals 7-9 mm long. Fruits are wider than high, slightly compressed, and shallowly notched at the base of the style. They are borne on straight or slightly curved stalks.

Bitterroot bladderpod is a Montana endemic known from open gravelly soil of exposed, alpine ridges near St. Mary's Peak and St. Joseph Peak west of Stevensville. It has also been reported to occur on Pyramid Buttes. (Not illustrated).

Physaria (Nutt.) Gray Twinpod

Twinpods are tuft-forming, taprooted perennials with usually prostrate stems and clustered basal leaves that have entire or toothed margins. The foliage is covered by star-shaped hairs. Petals are yellow, and the stalked flowers are borne on the terminal portion of the stem. The inflated, 2-lobed fruits are wider than high (ours) with a notch at the top between the two lobes.

See note under Lesquerella.

1. Fruits greatly inflated, not at all compressed.....(2) P. didymocarpa
1. Fruits compressed at right angles to the partition between the two lobes.....(1) P. geyeri

1. Physaria geyeri (Hook.) Gray

Geyer's Twinpod

Geyer's twinpod has 1-several decumbent to nearly prostrate, unbranched stems 10-20 cm (4-8 in) long. The clustered basal leaves, 3-6 cm long, have long petioles and egg-shaped blades. The several stem leaves are smaller and lance-shaped. The yellow petals are 5-11 mm long. Fruits, 5-7 mm long, have a deep notch on the top and are compressed at right angles to the partition between the seed chambers. They are borne on S-shaped stalks.

This early-blooming species is locally common in open, sandy or gravelly soil, often on steep roadcuts such as above the upper Mormon Creek Road and Nez Perce Pass in the Bitterroot Mountains and along the Lower Swift Creek Trail in the Sapphire Range. WA, ID, and W. MT.

2. Physaria didymocarpa (Hook.) Gray

Common Twinpod

This tuft-forming perennial has numerous, unbranched stems, 2-17 cm (1-7 in) long, from a taproot and mostly branched root crown beset with old leaves at the base. Stems arch outward from the base. The clustered basal leaves, 2-8 cm (1-3 in) long, have broad petioles and egg-shaped or rhombic blades with

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entire or few-toothed margins. The stem leaves are smaller and lance-shaped with entire margins. The yellow petals are 9-12 mm long. The greatly inflated, 2-lobed fruit, 1-2 cm long, has a deep notch between the two lobes. They are borne on straight or slightly curved stalks.

Common twinpod has been collected on a steep, dry, open slope in the foothills of the Sapphire Range. WA to Alta., south to ID and WY.

Raphanus L. Charlock, Radish

Raphanus raphanistrum L.

Jointed Charlock

Jointed charlock is a coarse annual or biennial with a weak taproot and simple or branched stems often over 1 m (40 in) tall. The lower leaves, 6-20 cm (2-8 in) long, are egg-shaped to broadly lance-shaped and deeply pinnately divided with a large terminal lobe. The upper leaves are smaller, eventually becoming sessile. Foliage is sparsely covered with stiff hairs. Flowering stems are borne in the axils of the upper leaves. The yellow petals are 15-20 mm long. The linear fruit, 45-60 mm long and 3-6 mm broad, is constricted between the seeds and grooved along the length with a long beak at both ends.

This species has been collected in disturbed soil in the Bitterroot Valley east of Hamilton. Introduced from Eurasia, an occasional weed in the Pacific Northwest.

The closely related R. sativus is the progenitor of the cultivated radish and has purplish flowers and fruits that are beaked only at the tip. It is common west and south of our area and is to be expected here.

Rorippa Scop. Yellowcress

Species of yellowcress are taprooted annuals or rhizomatous perennials with alternate, simple or pinnately divided leaves and foliage that is glabrous or covered with unbranched hairs. The stalked flowers are borne on stalks arising from the end of the stem or axils of the upper leaves. The small petals are yellow or white. Fruits are elliptical to linear and 3-sided to slightly compressed. The seeds are in 2 rows in each chamber of the fruit.

Members of this genus occur in moist, wet, or, aquatic habitats.

- | | | |
|----|--|------------------------------------|
| 1. | Plants rhizomatous perennials..... | 2 |
| 1. | Plants taprooted annuals or biennials..... | 4 |
| 2. | Petals white; plants usually aquatic or semi-aquatic..... | (1) <u>R. nasturtium-aquaticum</u> |
| 2. | Petals yellow; plants of moist habitats but not aquatic..... | 3 |
| 3. | Beak of fruit 1 mm long or less; petals 3-4 mm long..... | (3) <u>R. sylvestris</u> |
| 3. | Beak of fruit >1 mm; petals 4-5 mm long..... | (2) <u>R. sinuata</u> |
| 4. | Stalks of mature fruit 3-13 mm long, usually longer than the fruits..... | (4) <u>R. islandica</u> |
| 4. | Stalks of mature fruit 1-5 mm long, usually shorter than the fruits..... | 5 |
| 5. | Fruits narrowly elliptical (2-6 mm long and 2-3 mm wide)..... | (6) <u>R. obtusa</u> |
| 5. | Fruits more linear (6-15 mm long and 1-2 mm long)..... | (5) <u>R. curvisiliqua</u> |

Group I. This group contains rhizomatous perennials that root at the nodes.

1. Rorippa nasturtium-aquaticum (L.) Schinz & Thell.
[N. officinale R.Br.]

Watercress

Watercress has mostly glabrous foliage and creeping or floating stems up to 80 cm (32 in) long that root at the nodes. The petiolate leaves, 4-12 cm (2-5 in) long, are simple and oval-shaped or pinnately divided with narrow lateral lobes and a broad terminal segment. The white or purplish tinged petals are 3-4 mm long. The glabrous fruits, 10-25 mm long and about 2 mm wide, are straight or curved and borne on stalks that spread outward from the stem.

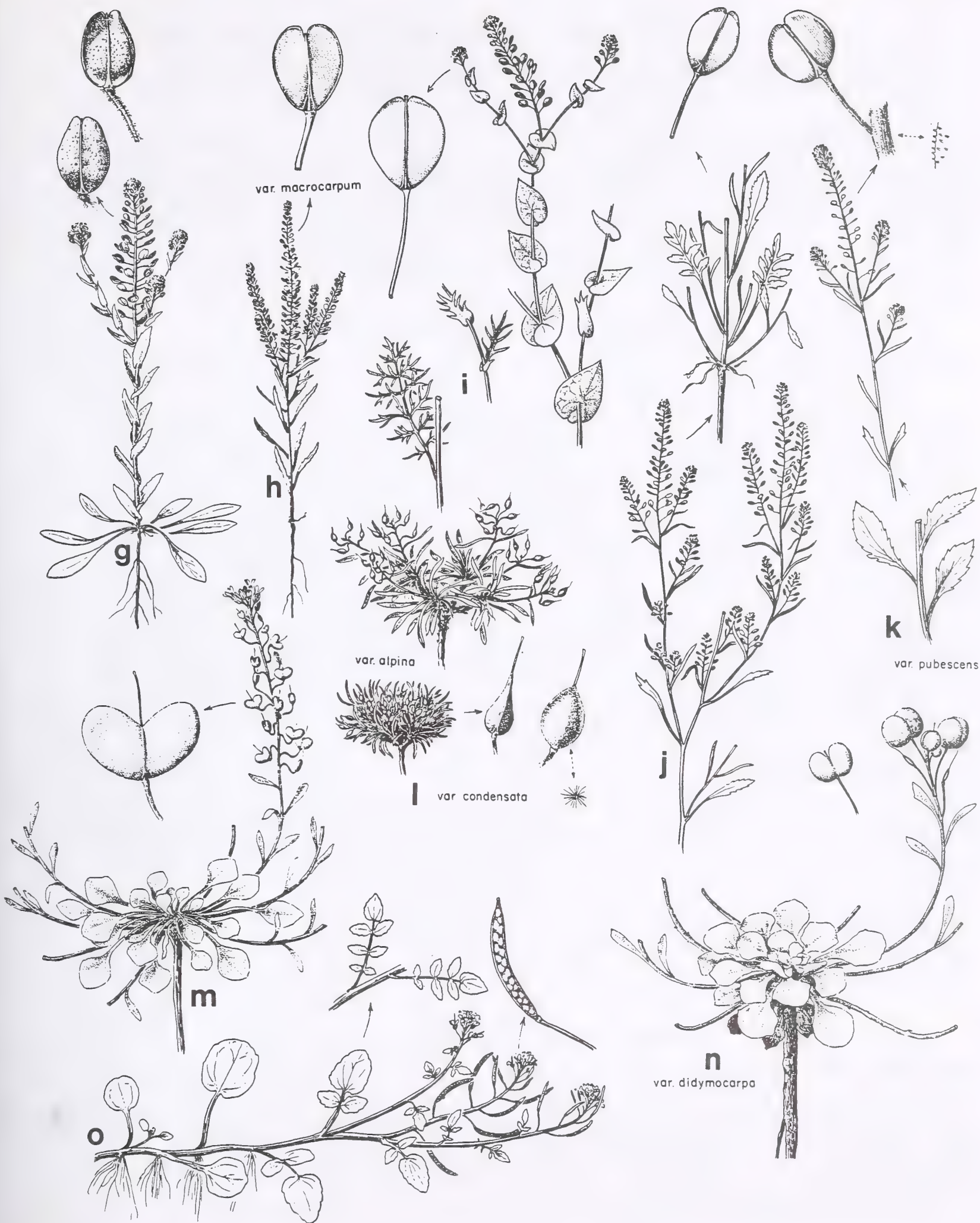
This European species is common in permanent, fresh, standing or moving water in the valleys and montane zone. Widespread in North America.

Watercress is an excellent salad green. Seedlings often establish along large streams or rivers and flower in late summer before being destroyed by ice scour and spring flooding.

2. Rorippa sinuata (Nutt.) A.S. Hitch.

Spreading Yellowcress

This rhizomatous plant has several simple or branched stems up to 40 cm (16 in) tall that arch outward at the base or are nearly prostrate. The lance-shaped leaves, 3-8 cm (1-3 in) long, are pinnately divided into entire or toothed segments. The lower leaves have short, winged petioles, while the upper are sessile with clasping bases. Foliage is mostly glabrous. The yellow petals are 4-5 mm long. The



g. *Lepidium campestre* h. *L. densiflorum* i. *L. perfoliatum* j. *L. ramosissimum* k. *L. virginicum*
 l. *Lesquerella alpina* m. *Physaria geyeri* n. *P. didymocarpa* o. *Rorippa nasturtium-aquaticum*

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glabrous, linear fruits, 5-12 mm long, are slightly curved and nearly 3-sided with a prominent beak (style) at the tip.

Spreading yellowcress is locally common in moist or wet, alkaline soil in the valleys and was once collected along the Clark Fork River near the university campus in Missoula. WA to CA, east to Sask., IL, TX, and AZ.

3. Rorippa sylvestris (L.) Besser

Creeping Yellowcress

Creeping yellowcress has erect stems up to 50 cm (20 in) tall from slender, branched rhizomes. The petiolate leaves are 4-10 cm (2-4 in) long and pinnately divided into narrow, sharply toothed lobes. Herbage is glabrous above but hairy below. The yellow petals are 3-4 mm long. The linear fruits, 8-10 mm long and 1-2 mm wide, are straight with a short beak and are held at spreading or ascending angles to the stem.

This Eurasian introduction has recently become established along the Clark Fork River from Missoula west to Grass Valley. Common in e. North America and sporadic in the west.

Group II. The species in this group are taprooted annuals and biennials.

4. Rorippa islandica (Oed.) Borbas

Marsh Yellowcress

[R. palustris (L.) Besser]

This is an annual or biennial with erect, mostly branching stems 25-70 cm (10-28 in) tall. The petiolate, lower leaves, up to 17 cm (7 in) long, are elliptical in outline and pinnately divided with a terminal lobe larger than the laterals. Upper leaves are smaller, sessile, lobed or toothed, and clasping at the base. The foliage is glabrous or hairy. The yellow petals are about 2 mm long. The oblong or narrowly elliptical fruits are 3-8 mm long, about as long as their stalks.

Var. glabrata (Lunnell) Butters & Abbe with glabrous foliage is common in open soil along rivers and streams but also can be found in grassy, moist or wet meadows in the valley and montane zones. Var. hispida (Desv.) Butters & Abbe has foliage with stiff hairs. It is as common as the former variety and occurs in the same habitats. Circumboreal south through most of temperate North America.

5. Rorippa curvisiliqua (Hook.) Bessey

Western Yellowcress

Western yellowcress is a glabrous to slightly hairy annual or biennial with stems 10-30 cm (4-12 in) tall that are simple or branched above. The petiolate, lower leaves, 2-7 cm (1-3 in) long, are broadly lance-shaped in outline and pinnately divided or deeply toothed. Upper leaves are smaller and sessile with the base clasping the stem. The yellow petals are 1-2 mm long. The linear fruits, 6-15 mm long and 1-2 mm wide, are curved with a short beak at the tip.

This species is locally common in moist or vernal inundated habitats, often near lakes or streams from the valley to subalpine zones. B.C. to Baja Cal., east to MT and CO.

6. Rorippa obtusa (Nutt.) Britt.

Blunt-leaved Watercress

[R. curvipes Greene]

This is a glabrous annual or winter annual with branching stems, 15-30 cm (6-12 in) long, that spread outward from the base, at least the lower portion often lying on the ground. The petiolate lower leaves, 2-6 cm long, are toothed or pinnately divided into shallowly toothed lobes. The upper leaves become sessile with toothed or lobed margins. The inflorescence consists of numerous flowering stems in the leaf axils. The pale yellow petals are 1-2 mm long. The narrowly elliptical fruits are about 3-6 mm long and wider at the base than the tip. They are longer than the stalks that bear them.

Var. obtusa has pinnately divided lower leaves and stems with at least the terminal portion ascending. It is uncommon in moist, open soil along the Clark Fork and Bitterroot rivers and in the lower subalpine zone of the Bitterroot Mountains. Var. alpina (Wats.) Britt. is a smaller plant with prostrate stems and lobed or toothed lower leaves. It was once collected at Lake Como southwest of Hamilton where the two varieties seem to intergrade. B.C. to CA, east to MI, MO, and TX.

Schoenocrambe Greene Plainsmustard

Schoenocrambe linifolia (Nutt.) Greene

Flaxleaf Plainsmustard

This is a profusely branched, perennial herb with stems up to 50 cm (20 in) tall from long creeping rhizomes and branched root stocks. Basal leaves are pinnately divided and usually withered by flowering time. The linear or narrowly lance-shaped stem leaves are 2-9 cm (1-4 in) long. Herbage is glabrous and often covered with a thin waxy coating. The yellow flowers have petals 6-10 mm long and are borne on stalks on the terminal portion of the stems. The linear fruits, 25-50 mm long and about 1 mm wide, are held nearly erect.

Flaxleaf plainsmustard has been collected on an island in the Clark Fork River west of Missoula. B.C. to NV, east to MT and NM.



p. *Raphanus raphanistrum* q. *Rorippa sinuata* r. *R. sylvestris* s. *R. islandica* t. *R. curvisiliqua*
 u. *Rorippa obtusa*

Sisymbrium L. Tumblemustard

Tumblemustards are annual or biennial herbs with densely hairy to glabrous herbage and deeply lobed or pinnately divided leaves. The stalked flowers are borne on the bractless, terminal portion of the stems. Flowers are yellow. The linear to awl-shaped fruits are straight or slightly curved.

Our two species are widespread Eurasian weeds.

1. Stalks of mature fruit slender, much thinner than the fruit; fruits held nearly erect..(2) S. loeselii
1. Fruit stalks nearly as thick as the fruit; fruits held at a spreading angle to the stem.....(1) S. altissimum

1. Sisymbrium altissimum L.

Jim Hill Mustard

Jim Hill mustard has erect, freely branched stems up to 150 cm (60 in) tall that are hairy at the base and glabrous above. The petiolate leaves are pinnately divided with numerous toothed or entire lateral lobes that are narrowly lance-shaped (below) to linear with a small, pointed lobe at the base. The yellow petals are 6-8 mm long. The spreading fruits, 5-10 cm (2-4 in) long, are slightly 4-angled. They are about as broad as the stout stalks that bear them.

This species is a conspicuous roadside weed in our area. It also occurs in disturbed soil of fields and grasslands in the valleys. Widespread in North America.

2. Sisymbrium loeselii L.

Tumblemustard

This species has erect, branched stems, sometimes more than 1 m (40 in) tall, that are hairy toward the base and mostly glabrous above. The pinnately divided leaves have a large, triangular terminal lobe and toothed, lance-shaped lateral lobes that curve backward. They have short petioles near the base but become sessile above. The yellow petals are 6-8 mm long. The nearly erect, straight or slightly curved fruits, 20-35 mm long, are round in cross section and borne on stalks that are noticeably narrower.

Tumblemustard is a conspicuous roadside weed; in our area it is more common than S. altissimum. It occurs in disturbed soil of fields and grasslands in the valleys. Widespread in North America.

Smelowskia Meyer SmelowskiaSmelowskia calycina (Steph.) Meyer

Alpine Smelowskia

Alpine smelowskia is a dwarf, tufted or mat-forming perennial with stems up to 15 cm (6 in) tall from semi-woody, branched root crowns that are covered by old leaf bases. The petiolate basal leaves, 1-10 cm long, are pinnately divided with narrow lobes. The sessile stem leaves are reduced upward. The herbage is grayish with a dense covering of simple and branched hairs. The sweet-scented flowers are borne in headlike clusters that elongate as the plant matures. Petals are 4-8 mm long and white, often with a purplish tinge. The glabrous fruits, 5-11 mm long and 1-3 mm wide, are cylindrical, tapered at both ends, and held nearly erect.

This arctic-alpine plant is common in stony, open soil of windswept ridges and summits near or above timberline in the Bitterroot Mountains. Widespread in w. North America and e. Asia.

Alpine smelowskia flowers in May or June in dry, open habitats. Plants in shady sites where snow lies late produce lax stems and elongated leaves and bloom later or not at all.

Thlaspi L. Pennycress, Fanweed

Members of this genus are glabrous, annual or perennial herbs with leaves that have entire or toothed margins. The stem leaves have small lobes at the base that clasp the stem. The stalked flowers are borne on the bractless, terminal portion of the stems. Petals are white. The flattened fruits are egg-shaped to narrowly elliptical with a notch at the top and broad or narrow winged margins.

1. Plants annual weeds; fruit broadly wing-margined, >10 mm high.....(1) I. arvense
1. Plants native perennials; fruit with narrow winged margin, usually <10 mm tall..... (2) I. fendleri

1. Thlaspi arvense L.

Pennycress, Fanweed

Pennycress is an annual herb with simple or branched stems, 10-50 cm (4-20 in) tall, and a weak taproot. The basal leaves, 2-6 cm (1-2 in) long, have a short petiole and are broadly lance-shaped with wavy margins. They wither as the plant matures. The stem leaves become smaller and sessile with clasping bases. The petals are 3-4 mm long. The nearly round to egg-shaped fruits, 10-17 mm long, have a broad winged margin and a deep notch at the top with the minute style at the base.

This introduced species is most common in cultivated or formerly cultivated soils but also occurs along roads and in other disturbed habitats in the valleys. Widespread in temperate North America.

The large, penny-shaped fruits are distinctive.

2. Thlaspi fendleri Gray
[T. montanum L.]

Wild Candytuft

Wild candytuft forms loose tufts or mats with few to several, simple or sparingly branched stems up to 20 cm (8 in) tall from a simple or branched root crown. The clustered, petiolate, basal leaves, 15-40 mm long, have lance-shaped or narrowly elliptical blades with entire or weakly toothed margins. The several stem leaves are sessile with bases that clasp the stem. Foliage is glabrous and often has a thin waxy coating. The petals are 4-6 mm long. The slightly wing-margined fruits, 4-10 mm long, are narrowly triangular, broadest at the top and tapered to the base. The top is flat or shallowly notched with a slender, persistent style.

Var. glaucum (Nels.) Hitchc. has numerous stem leaves and is usually at least 10 cm (4 in) tall. It is a locally common spring flower in valley grasslands and also occurs near timberline in the southern Bitterroot Mountains. Var. idahoense (Pays.) Hitchc. is smaller (less than 10 cm) with fewer (about 1-5), leathery, stem leaves. It has been found on Mount Jerusalem and Watchtower Peak southwest of Darby in the Bitterroot Mountains. B.C. to CA, east to Alta. and NM.

The two varieties appear to intergrade in our area.

CUCURBITACEAE Cucumber or Gourd Family

The trailing or climbing vines of the Cucumber Family include perennial and annual life forms that bear unisexual flowers; both sexes on a plant, or the sexes borne on separate plants. Flattened seeds are produced in dry or fleshy fruits.

Bryonia L.Bryonia alba L.

Bryonia

Bryonia is a perennial climbing vine with a thick, carrotlike, woody taproot. The coarsely serrate leaves have 5 irregular lobes that taper to a point. The small, yellowish-green flowers are borne in narrow inflorescences arising from the leaf axils. Fruits are pea-sized black berries.

The east Rattlesnake Creek area north of Missoula has the distinction, at least in the Northwest, of supporting the only known population of this Eurasian cucurbit. (Not illustrated).

Echinocystis T. & G. Balsam Apple, Wild CucumberEchinocystis lobata (Michx.) T. & G.

Wild Mock Cucumber

Wild mock cucumber is a high-climbing vine with angular, grooved stems. The alternate leaves are palmately 5-lobed, the lobes triangular-shaped and acute. The small flowers with greenish-white corollas develop into egg-shaped, prickly fruits.

This species was collected in Missoula's Greenough Park. This cucurbit of moist bottomlands is widely distributed across North America, from N.B. to FL and west to Sask., ID, MT, and AZ.

CUSCUTACEAE Dodder Family

Cuscuta L. Dodder, Love Tangle

Dodders are leafless, twining perennials with slender, glabrous stems colored pink, whitish, or yellowish, but never green. Both the leaves (tiny scales) and pink to white flowers are highly reduced. As a consequence species can be identified only with a microscope or hand lens. Of the several species occurring in Montana, each parasitizes a different flowering plant host. So uncommon is dodder in our area that only a single late season (non-identifiable) collection from Centaurea maculosa has been taken. However, Cuscuta approximata Bab. and C. epithymum Murr. have been identified from western Montana beyond the bounds of our area. (Not illustrated).

DIPSACACEAE Teasel Family

The teasel family includes perennial and biennial herbs with stout stems. The opposite leaves are entire or pinnately divided. The perfect flowers are borne sessile in dense clusters, globose in outline and subtended by conspicuous bracts. The calyx is cup-shaped, and the corolla is irregularly 4-lobed. Fruits are achenes (seeds with a thin covering).



v. *Schoenocrambe linifolia* w. *Sisymbrium altissimum* x. *S. loeselii* y. *Smelowskia calycina* z. *Thlaspi arvense*
a. *Thlaspi fendleri* b. *Echinocystis lobata*

Dipsacus L. TeaselDipsacus sylvestris Huds.

Teasel

[D. fullonum L.]

Stoutly taprooted, teasel has a coarse and several-angled, stem, up to 2 m (6 ft) tall, that is increasingly prickly upward. The opposite, lance-shaped stem leaves are sessile, joined at their bases around the stem and distinctly prickly on the lower surface of the midrib. The lance-shaped basal leaves dry and drop early in the second summer. The huge egg-shaped heads that terminate the stem are armed with numerous, sharp-pointed bracts. Small, bluish-purple flowers gradually open from the base upward.

The mature plants are much sought after for dry flower arrangements. Huge quantities come into the trade from "south of Hamilton" and it is known from roadsides northeast of Missoula. Plants occur mostly on disturbed soils with appreciable water holding capacity. Native to Europe, it now occurs throughout North America.

Knautia L.Knautia arvensis (L.) Coult.

Knautia

This perennial has stems up to 1 m (39 in) tall from a branching caudex and taproot. The lowermost leaves are usually just toothed; other stem leaves gradually become more pinnately dissected above. Snowy, lilac-purple, hemispheric heads terminate the stem.

This species has been known for 50 years along the West Fork Bitterroot River highway (Trapper Creek Job Corps Center vicinity). European in origin, this showy plant is established in B.C. and a few places in MT.

DROSERACEAE Sundew Family

Drosera L. Sundew

These are perennials with basal rosettes of leaves covered with viscid, stalked glands that trap and digest small insects. Few to several short-stalked flowers are borne on 1 side at the end of an erect, naked stem. Each flower has 5 petals and sepals that are separate to the base or nearly so. There are 4-20 stamens and 3-5 deeply divided styles. The ovary is superior or slightly inferior, and the fruit is a dry capsule with numerous seeds.

1. Leaves held upward, the blades 2-several times as long as broad.....(2) D. anglica
1. Leaves spreading, the blades as broad as long.....(1) D. rotundifolia

1. Drosera rotundifolia L.

Roundleaf Sundew

Roundleaf sundew has spreading leaves with a round blade that is about 1 cm in diameter and stout petioles 2-5 cm (1-2 in) long. The 3-10 flowers are borne on a stem that is up to 15 cm (6 in) long. The white or pinkish petals are 5-10 mm long.

Both Drosera species occur in our area only in association with Sphagnum moss. D. rotundifolia is known from Mary's Frog Pond west of Lolo in the Bitterroot Mountains and at Shoo-fly Meadows in the Rattlesnake Mountains. Circumboreal, south in North America to CA, ID, IL, and FL.

2. Drosera anglica Huds.

Great Sundew

[D. longifolia L.]

This species has erect or ascending leaves with narrowly lance-shaped blades, 1-3 cm long, that taper to petioles that are 2-8 cm long. The 2-7 flowers are borne on the naked stem that is up to 18 cm (7 in) tall. The lower 1/3 of the calyx lobes are united.

Great sundew is known from a small bog near Lost Trail Pass. Circumboreal, south in North America to CA, ID, IL, and e. Can..

ELAEAGNACEAE Oleaster Family

Elaeagnus L. Silverberry

These are shrubs or trees bearing alternate and silvery-gray leaves and bisexual flowers. Fruits are egg-shaped, widest near the tip, and also silvery-gray. Both our species, but especially Russian olive, are used horticulturally.

1. Unarmed, strongly rhizomatous shrub, 1-4 m tall.....(2) E. commutata
1. Armed, nonrhizomatous small tree (large shrub) to 8 m (25 ft) tall.....(1) E. angustifolia

ERICACEAE

1. Elaeagnus angustifolia L.

Russian Olive

Russian olive is a small tree, to 8 m (25 ft) tall, with spine-tipped branches and narrow, linear or oblong lance-shaped leaves and juvenile branches that appear silvery.

Russian olives, Asian in origin, were introduced to produce effective windbreaks. They seed themselves repeatedly next to existing plantings and have the ability to exist wholly on their own.

2. Elaeagnus commutata L.

Silverberry

Silverberry is an erect, strongly rhizomatous, and unarmed shrub about 1-4 m (3-16 ft) tall. The silvery leaf blades are 2-7 cm long, lance-shaped to oblong, and covered with scalelike particles. Fruits are dry, mealy berries about 1 cm long.

Silverberry is adapted to dry soils but in northwestern Montana is associated with riparian situations which may be seasonally dry and gravelly. It is known to occur naturally in the Blackfoot River Valley about 28 km (17 mi) east of Missoula and immature plants were noted on two islands in the Clark Fork River near Missoula. These populations apparently do not occur as extensive colonies typical of the species.

Shepherdia Nutt. Buffaloberry, Soapberry

These are opposite-leaved shrubs or small trees bearing female and male flowers on separate plants. Fruits are fleshy, yellowish to bright red berries.

1. Leaves silvery on both surfaces; branches often spine-tipped.....(2) S. argentea
1. Leaves green above, brown-scaly below; branches unarmed.....(1) S. canadensis

1. Shepherdia canadensis (L.) Nutt.

Canada or Bitter Buffaloberry, Soapberry

Soapberry is an unarmed, 1-3 m (3-9 ft) tall spreading shrub that appears brownish-green due to the star-shaped hairs on the foliage. The paired leaves have a bright green upper surface and paler lower surface with minute, though conspicuous, brown scales. The inconspicuous yellow-green flowers mature to bright fleshy red (or yellow) 1-seeded berries.

The berries are bitter and though not palatable to man are sought after by wildlife. When huckleberry production is down, soapberry is an important summer component of bear diets. This is a very common shrub in forested environments, especially montane to subalpine lodgepole pine forests. It quickly reestablishes following fire. Ranging from AK south to OR and east through the Rocky Mountain states to the Atlantic Coast.

2. Shepherdia argentea (Pursh) Nutt.

Thorny Buffaloberry, Rabbitberry

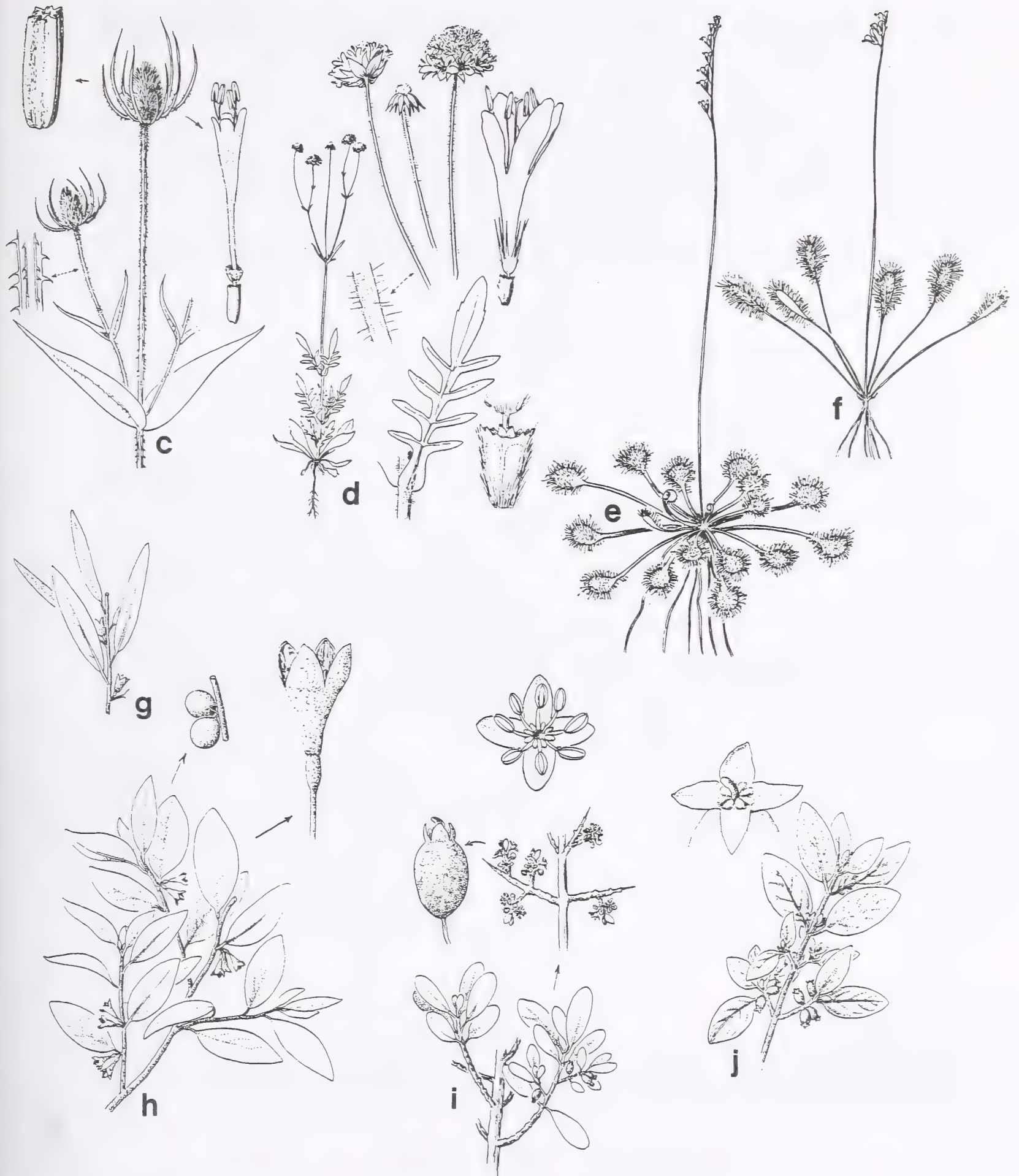
Buffaloberry is a large shrub to small tree with silvery young twigs covered with minute, scalelike particles and older branches that are brown and often spine-tipped. Narrowly oblong to lance-shaped leaves have scalelike particles on both sides. Flowers clustered on short branches often blossom prior to leaf expansion. The fruit, 4-6 mm long and elliptical in outline, is yellow to red.

The edible berries were used by Native Americans. In our area this riparian species is rare. Old records indicate a population on lower Skalkaho Creek near Hamilton, and 2 plants were found on islands in the Clark Fork River near Missoula. Sporadically occurring south from B.C. to s. CA and east to MN and central Can.; however, not known from WA or ID and in MT found chiefly east of Rocky Mountains.

ERICACEAE Heath Family

Members of the Heath Family include perennial herbs, semi-shrubs, and shrubs. They are evergreen and deciduous species and saprophytic plants lacking green parts with leaves reduced to bracts. Leaves are simple with entire or toothed margins. Flowers are arranged singly or paired in the leaf axils or terminally in few-flowered clusters. There are 4-5 sepals and petals. The urn- to vase- (rarely funnel- or umbrella-) shaped corollas range in color from white to yellow and greenish-yellow to red. Sepals are united to varying degrees. The single style is straight or curved with a globular or lobed tip. The number of stamens is that of or double the number of corolla lobes. Pollen is shed from terminal anther pores. Fruit is a berry or dry capsule.

1. Fleshy plants lacking green parts, leaves reduced to scales or bracts.....2
1. Plants having green parts and leaves not reduced to scales or bracts.....5
2. Flowers lacking corolla, and long axis of stem striped pink and white.....Allotropa
2. Flowers with corolla and stem not pink or white striped.....3
3. Corolla urn-shaped and mature stem red.....Pterospora
3. Corolla not urn-shaped and lacking red stem.....4



c. *Dipsacus sylvestris* d. *Knautia arvensis* e. *Drosera rotundifolia* f. *D. anglica* g. *Elaeagnus angustifolia*
h. *Elaeagnus commutata* i. *Shepherdia argentea* j. *S. canadensis*

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4. Flowers solitary and terminal, petals drying to black color.....Monotropa
4. Flowers multiple in racemes, petals drying to brown.....Hypopitys
5. Perennial evergreen or semi-evergreen forbs and dwarf subshrubs (woody only near base).....6
5. Evergreen shrubs of various sizes.....7
6. Plants herbaceous, leaves at or near base and not whorled.....Pyrola
6. Plants woody at base, leafy beyond base with some occurring in whorls.....Chimaphila
7. Petals not united, leaves with yellowish resinous glands beneath.....Ledum
7. Petals united, leaves not as above.....8
8. Leaves numerous, crowded on stem, strap-shaped (smaller than 2 x 10 mm) with margins rolled under.....Phyllodoce
8. Leaves lacking the complex of above-cited characters, but may possess one or more of the characters..9
9. Leaves opposite (some may be alternate or whorled).....10
9. Leaves alternate.....11
10. Leaves scale-like, sessile, appressed, overlapping and covering brachlets.....Cassiope
10. Leaves fewer, larger and having short petioles.....Kalmia
11. Flower single in leaf axile.....12
11. Flowers in axillary or other clusters.....13
12. Leaves evergreen, petals not urn-shaped, anthers with 2 spurs.....Gaultheria
12. Leaves deciduous, petals urn-shaped, anthers without horns.....Vaccinium
13. Plants upright shrubs, mature specimens at least 50 cm (1.5 ft) high.....14
13. Plants prostrate or creeping shrubs less than 30 cm (1 ft) high.....Arctostaphylos
14. Perianth parts in fours, corolla 6-9 mm long.....Rhododendron
14. Perianth parts in fives, corolla 10-22 mm long.....Menziesia

Saprophytic Species (Monotropaceae)

All species have unbranched stems, scalelike leaves and are not green (lacking chlorophyll). As saprophytes they grow in association with mycelia of certain fungi on decaying plant parts. Their seasonal regrowth is no more predictable than that of mushrooms.

Allotropa T. & G. Candystick

Allotropa virgata T. & G. ex. Gray

Candystick

The white and pink striped stem up to 40 cm (16 in) tall renders candystick a distinctive plant in the wild. When picked and dried, it fades to a dull black. The whitish leaves taper gradually to a point that curves outward. Though lacking a corolla, the spikelike raceme is still colorful due to pink, white or brownish sepals.

Though elsewhere in its range this species occurs in lower elevation coniferous forest, in our area where it is rare, all collections have been above 2100 m (7,000 ft) in the upper subalpine zone. Ranges from B.C. and east slope of the Cascades south to the Sierra Nevada and coastal ranges of CA.

Hypopitys Hill. Pinesap

Hypopitys monotropa Crantz

Pinesap

This saprophyte is straw-colored to pale pink and 10-25 cm (4-10 in) tall. Flowers are borne in the axils of upper leaves. The inflorescence is curved while in flower but becomes straight at maturity.

Pinesap is uncommon in the Bitterroot Mtns, usually associated with subalpine stands of lodgepole pine. It has a circumboreal distribution and is usually found in humus rich soils.

Monotropa L. Indian Pipe

Monotropa uniflora L.

Indian Pipe

Indian pipe has a cluster of waxy-white stems, 5-25 cm (2-10 in) tall, that blacken with age. They are capped by single nodding flowers that mature to an erect capsules.

A circumboreal species that is rare in our area (one sighting near Hamilton). Indian pipe grows on thick humus in deep shade of coniferous forests.

Pterospora Nutt. Pinedrops

Pterospora andromeda Nutt.

Pinedrops

Pinedrops has brownish-red, sticky stems up to 1 m (3 ft) tall, making them the tallest of our saprophytes. Though initially fleshy, stems dry and remain standing a year or more with globose, ruptured capsules attached. There are as many as 60 pale yellow flowers, each drooping from the axil of a linear bract.

Pinedrops is our most common and robust saprophyte, hence our best known. It is associated with coniferous forest, in our area usually ponderosa pine. This lone member of the genus is confined to North America, ranging from AK to s. CA and east to the Atlantic Coast.

Non-Saprophytic Species

Arctostaphylos (L.) Spreng. Manzanita

Arctostaphylos uva-ursi (L.) Spreng.

Bearberry, Kinnikinnick

This plant is a low shrub, densely branched with trailing, reddish to brown stems that root at the nodes. Bearberry forms mats 5-20 cm (2-8 in) tall. The alternate, somewhat leathery leaves are spoon- to lance-shaped. Flowers are urn-shaped and arranged in few-flowered, nodding and terminal clusters. The mealy, flavorless, and bright red berries often persist through the winter.

Bearberry is common in open areas with dry or well-drained soils. In our area it is most often found in ponderosa pine and Douglas-fir forests, becoming rare near timberline. In other areas this circumboreal shrub is a component of the alpine flora.

Cassiope D. Don. Moss, White or Mountain Heather

Mountain heathers are low-growing, creeping and evergreen shrubs of high mountain environments. They have small, scale-like leaves and white, bell-shaped flowers.

1. Leaves prominently grooved on the back and short-hairy with fringe of longer hairs on the margins.....(2) C. tetragona
1. Leaves not grooved but keeled on back and hairless or with only a hairy margin.....(1) C. mertensiana

1. Cassiope mertensiana (Bong.) G. Don.

Western White Heather

This is a mat-forming shrub 5-30 cm (2-12 in) high. The scalelike sessile leaves are grooved at the very base, 4-ranked, and dense enough to obscure the stem. The delicate, white, bell-shaped corollas are set off by reddish sepals.

Western white heather occurs throughout the Bitterroot Mountains at the highest reaches of open subalpine forests and moist alpine meadows. This is the most arresting of the five heathers native to Montana. It occurs with the other heathers to form a dark green carpet in old-growth alpine larch stands. In a zonation of heather communities it dominates the mid-zone, the pink-flowered Phyllodoce empetrifolia below and the yellow heath, Phyllodoce glandulifera above in the more wind and sun exposed environments. Ranging from AK south to CA and NV and east to MT and the Canadian Rockies.

2. Cassiope tetragona (L.) D. Don.

Northern Mountain Heather

In gross appearance and habitat, northern mountain heather is much like white heather, but the scalelike leaves of northern mountain heather are grooved the full length of the lower surface.

This circumboreal arctic-alpine species occurs on the northernmost summits of the Bitterroot Mountains, specifically Lolo, Sweeny, St. Joseph's (most extensive population) and St. Mary's Peaks. All colonies are found in the alpine on north- and east-facing slopes. These colonies may be the southernmost outliers of the species.

Chimaphila Pursh. Pipsissewa, Prince's Pine

These are short, evergreen semi-shrubs (only the base woody) originating from long, creeping rootstocks with simple to branched stems. The leathery, glabrous leaves are whorled. Flowers with 5 persistent sepals and petals are pendent on short terminal stalks.

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1. Flowers 1-3, flowering stalks 2-5 cm long.....(2) C. menziesii
1. Flowers 5-15, flowering stalks 5-10 cm long.....(1) C. umbellata

1. Chimaphila umbellata (L.) Bart.

Prince's Pine, Pipsissiwa

Pipsissewa is taller (to 30 cm, 12 in) and a more robust sub-shrub than C. menziesii. The leathery, whorled leaves are inversely lance-shaped or egg-shaped with sharply toothed margins. Flowers are deep pink to rose with stamen stalks bearing hairs only on the margins of the swollen base.

This circumboreal species is common in our coniferous forests with the exception of the dry, foothill ponderosa pine stands and the upper subalpine zone. From AK south to CA and east to the Rocky Mountains of CO and to the Atlantic Coast.

2. Chimaphila menziesii (R. Br.) Spreng.

Little Prince's Pine

Where they co-occur, C. menziesii is generally distinctly smaller, 5-15 cm (2-6 in), and more delicate than C. umbellata, with serrate to entire, dark, glossy green leaves that are widest at or slightly below the middle. There are 1-3 stalked, pink flowers borne in an unbranched inflorescence. Anther stalks have hairy, swollen bases.

Little prince's pine is scattered in forests throughout the subalpine zone in the Bitterroot Mountains. Ranging from B.C. south to s. CA and east to ID and MT.

Gaultheria L. Wintergreen, Salal

Gaultheria humifusa (Grah.) Rydb.

Alpine or Matted Wintergreen

Alpine wintergreen is a delicate, dwarf evergreen shrub (scarcely 3 cm high) whose creeping stems form small mats. The entire to minutely toothed leaves are broadly egg-shaped to elliptical. The small (to 4 mm long), white to pinkish and bell-shaped flowers are borne singly in the leaf axils. They mature to scarlet berries about 5 mm in diameter.

In our area this species is found most frequently in mossy, wet to moist subalpine environments. In the Cascades ranging south from B.C. to n. CA and east in Rocky Mountains from Alta. to CO.

Kalmia L. Laurel

Kalmia microphylla (Hook.) Heller

Alpine or Mountain Laurel

Alpine laurel is a much-branched, dwarf, evergreen shrub, up to 20 cm (8 in) tall, that spreads by short rhizomes and layering. The opposite, lance-shaped to elliptical leaves often have inrolled margins and are shiny dark green above and grayish beneath due to dense, fine hairs. Several deep rose-colored, bowl-shaped, shallowly 5-lobed flowers are arranged at the end of upright, red stalks. Fruits are hard, somewhat round and deeply lobed capsules.

Alpine laurel is found from montane to upper subalpine zones associated with wet, acidic substrates such as mountain lake margins and moss-dominated (especially Sphagnum) communities. From AK south in the Cascades to CA east to Rocky Mountains and south from Alta. to WY and CO.

Ledum L. Labrador Tea

Ledum glandulosum Nutt.

Glandular-leaved Labrador Tea, Trapper Tea

Labrador tea is a mid-sized, evergreen shrub, up to 60 cm (24 in) tall, with short, fine hairs and glands on young branches, petioles, and lower leaf surfaces. The elliptical-oblong to egg-shaped, alternate leaves are clustered near stem tips to give a whorled effect. They are green above and grayish beneath. White flowers are arrayed in rounded clusters at stem tips. All plant parts smell of turpentine when crushed.

In the mid- to upper subalpine zones, this species occurs on permanently moist to wet, acidic soils, often along creeks. In the alpine zone it is found on boulderfields. Our variety is glandulosum, ranging from B.C. south on the east side of Cascades to WA, and east in the Rocky Mountains to MT, n. WY, and central ID.

Menziesia Smith Menziesia

Menziesia ferruginea Smith

Menziesia, Fool's Huckleberry, False Azalea

Fool's huckleberry is an erect to spreading, deciduous shrub with shredding grey-brown bark, growing to 1.8 m (6 ft) tall on favorable sites. Alternate leaves are crowded on stem tips giving a whorled



k. *Allotropa virgata* l. *Hypopitys monotropa* m. *Monotropa uniflora* n. *Ptersospora andromeda*
o. *Arctostaphylos uva-ursi* p. *Cassiope mertensiana* q. *C. tetragona* r. *Chimaphila menziesii* s. *C. umbellata*
t. *Gaultheria humifusa* u. *Kalmia microphylla* v. *Ledum glandulosum*

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effect. They are thin, dull blue-green above, light green beneath, and oblong-elliptical to egg-shaped. The most distinctive leaf features are a small, pointed leaf tip and a skunky odor when crushed. The small, urn-shaped, light cinnamon-pink flowers are borne in terminal cluster on the previous year's growth. Fruit is an oval capsule.

Menziesia is an undergrowth dominant on moist, wooded north- and east-facing slopes of the mid- to upper subalpine zone, often associated with *Vaccinium globulare* and *Rhododendron albiflorum* (on higher elevation sites). Our plants belong to the variety *glabella* which ranges from B.C. to Alta. south to MT, WY, ID, and e. WA.

Phyllodoce Salisb. Mountain Heath, Mountain Heather

These dwarf, evergreen shrubs have crowded, alternate and linear leaves. The urn- to bell-shaped flowers are borne in terminal, umbrellalike clusters.

1. Corolla >2 times as long as calyx, pink to rose colored and hairless outside.....(1) *P. empetrifloris*
1. Corolla scarcely 2 times as long as calyx, yellowish to greenish-white, outer surface glandular and hairy.....(2) *P. glanduliflora*

1. *Phyllodoce empetrifloris* (Sw) D. Don.

Pink or Red Mountain Heather

A highly branched, matted, dwarf shrub, 10-30 cm (4-12 in) tall, has a glandular-hairy stem that becomes glabrous with age. The needlelike leaves are glabrous except for minutely glandular margins. Flowers are bell-shaped with pink to rose-colored petals.

This is our most common heather, and its range extends to much lower elevations than those of the other heathers, to the upper reaches of the spruce-fir forest. It is most commonly associated with open whitebark pine and alpine larch stands, alpine meadows, and snow glades, forming expanses on north- and east-facing slopes where snow is late to melt. Ranges south from AK to CA and east to ID and MT.

P. empetrifloris hybridizes with *P. glanduliflora* to produce plants known as *P. X intermedia* (Hook.) Camp. These plants have intermediate characteristics, such as apple-blossom pink flowers (ranging from near white to shell pink). This locally common hybrid occurs below the alpine habitat of *P. glanduliflora* but above timberline (usually with *P. empetrifloris*).

2. *Phyllodoce glanduliflora* (Hook.) Cov.

Yellow Mountain Heather

In gross aspect yellow mountain heather is much like pink mountain heather. Vegetatively *P. glanduliflora* is distinguished by having more glandular to minutely pubescent leaves. The flowers of *P. glanduliflora* are yellow to greenish-white and densely glandular to minutely hairy.

The areal extent of yellow mountain heather is much less than that of red or white heather, but it probably occurs on every alpine summit in the Bitterroot Mountains. It is evidently our heather with the greatest tolerance of exposure and least dependence on snow cover. Distributed in the Rocky Mountains south from AK and Yuk. to WY and in the Cascade Range to OR. See *P. empetrifloris* for note on hybridization.

Pyrola L. Wintergreen, Pyrola

Propagating by long slender rhizomes, pyrolas are glabrous, herbaceous perennials with shiny, leathery and persistent leaves clustered at the base of an erect, unbranched flowering stalk. The waxy, nodding, and 5-petaled flowers mature to capsules. Most species are dependent on wood-rotting fungi to some degree. The genus is widely distributed in the Northern Hemisphere. *Pyrola chlorantha*, *P. minor*, *P. secunda* and *P. uniflora* are circumboreal. *Pyrola asarifolia* and *P. elliptica* are North American species, whereas *P. dentata* and *P. picta* are endemic to the Pacific Northwest.

1. Single flower terminal on 3-15 cm scape (bare stalk).....(8) *P. uniflora*
1. Flowers 2-numerous.....2
2. Style straight or nearly so, length 2 mm or less;..... (5) *P. minor*
2. Style curved, usually longer than 2 mm;.....3
3. Flowers turned to one side of stem (secund).....(1) *P. secunda*
3. Flowers not turned to one side of stem.....4
4. Leaf blades mostly inversely lance-shaped, tapering to an acute base.....(3) *P. dentata*
4. Leaf blades usually rounded at base, broadly elliptical, egg-shaped or nearly round.....5
5. Leaves prominently white-mottled along the main veins of the upper surface.....(7) *P. picta*
5. Leaves not as above.....6

6. Corolla pink to purplish.....(2) P. asarifolia
 6. Corollas white, greenish-white to yellowish.....7
 7. Leaf blades less than 2.5 cm (3.5 cm) long.....(3) P. chlorantha
 7. Most leaf blades longer than 3.0 cm.....(4) P. elliptica

1. Pyrola secunda L. Sidebells Pyrola, One-sided Wintergreen
 [Orthilla secunda (L.) House]

Sidebells pyrola has stems up to 15 cm (6 in) tall clustered from a long, thin, branched rhizome. Several broadly lance-shaped to elliptical, olive green leaves and more than twice this number of small bracts are arranged on the lower part of each creeping and ascending stem. The 6-20 small, white flowers with petals that fall shortly after opening are distinctively arranged on 1 side of the stalk (hence name secunda, one-sided).

Of our pyrola species, this is the most common and distributed across the greatest number of wooded habitats, from montane Douglas-fir forests to near timberline. From AK south to Mex. and east to the Atlantic Coast.

2. Pyrola asarifolia Michx. Pink or Alpine Wintergreen

This is the most robust member of the genus with stems up to 30 cm (12 in) tall. Leaves are dark green above and purplish below with petioles at least as long as the blades. Flowers are pink to rose or even purplish-red.

Var. purpurea (Bunge) Fern. has pointed leaf blades that are finely toothed. Var. asarifolia has broadly oval to spade-shaped leaf blades that are rounded at the tip. This common pyrola is found in wet to moist habitats from riparian poplar stands of the valleys up to mid-subalpine conifer forests. Its range stretches from AK to most of w. US and east across Can. to ne. N. Am.

3. Pyrola chlorantha Sw. Green Wintergreen, Green Pyrola

Green pyrola has orbicular to broadly oval leaves with blades that are darker green beneath than above and shorter than the petiole. Flowers, pale yellow to cream or greenish-white, are borne on a stalk that is up to 18 cm (7 in) tall.

Green pyrola is less dependent on moisture than P. asarifolia. It is common from lower elevation Douglas-fir to mid-subalpine spruce-fir and lodgepole pine forests. From AK south to CA and east in Can. to the Atlantic Coast.

4. Pyrola elliptica Nutt. White Wintergreen

The leaves of white wintergreen are less leathery than those of the 3 species described above. The blades are broadly elliptical or inversely egg-shaped and longer than the petioles. The white to greenish-white flowers are mildly and pleasantly aromatic.

Though Flora of the Pacific Northwest does not note the presence of this species in MT, it has been found with P. asarifolia in Bitterroot Valley riparian areas associated with poplar communities. Northeast North America west to B.C. and w. MT.

5. Pyrola minor L. Lesser Wintergreen, Lesser Pyrola

Lesser pyrola has broadly elliptical to rotund leaf blades about the same length as petioles. In vegetative state it is easily confused with P. chlorantha. The flowers, mostly light pink to nearly white, have a short, straight style, that sets this pyrola apart.

Lesser pyrola is found in protected, moist (not wet) environments (often bottomlands) of the Bitterroot Mountains, not higher than the mid-subalpine zone. In other ranges it may occur near timberline. From AK south to s. CA east to the Atlantic Coast, south in Rocky Mountains to CO.

6. Pyrola dentata Smith Toothleaf Pyrola

The leaves of toothleaf pyrola differ from those of our other pyrolas by having a whitish waxy coating, bluish-green cast, and generally inversely lance-shaped to narrowly elliptical shape. Toothed or dentate leaf margins are usually present but not diagnostic. Flowers are cream to greenish-white and borne on a naked stalk.

In our area toothed pyrola is uncommon to rare. It occurs in drier habitats, typically ponderosa pine-Douglas-fir and lodgepole pine forests of well- to excessively-drained sites. Ranging from B.C. south to n. CA and east to MT, ID, and WY.

7. Pyrola picta Smith White-veined Wintergreen

The whitish mottling along the main veins of the upper surface contrasts with dark green background and serves to distinguish the leaves of this species from all others. Leaf blades are leathery, egg-shaped



w. *Menziesia ferruginea* x. *Phyllodoce empetrifomis* y. *P. glanduliflora* z. *Pyrola asarifolia*
a. *Pyrola chlorantha* b. *P. dentata* c. *P. elliptica* d. *P. minor*

to broadly elliptical, longer than petioles. The yellowish flowers are similar to those of *P. dentata* and *P. chlorantha*, but arranged on a reddish-brown stem, 10-25 cm (4-10 in) tall.

White-veined pyrola is uncommon to rare in our area, known from only a few open lodgepole pine and larch dominated stands at about the 1600 m (5,500 ft) level. From B.C. south to s. CA and east to Rocky Mountains from Alta. to CO.

8. *Pyrola uniflora* L.

Woodnymph, One-flowered Wintergreen

[*Moneses uniflora* (L.) Gray]

Our smallest pyrola has stems less than 10 cm (4 in) tall with small, broadly elliptical to inversely egg-shaped, serrated leaves. It is fastened to pieces of rotting wood by roots with little "sucking cups" at their tips. Most distinctive is the single, white, star-shaped and delicately fragrant flower nodding at the stem tip.

Though not common, woodnymph can be found in deep shade of moist to wet conifer stands in the montane to subalpine zones. From e. N. Am. west to AK and south to CA and in the Rocky Mountains to NM.

Rhododendron L. *Rhododendron*

Rhododendron albiflorum Hook.

White *Rhododendron*

Slender, erect, and deciduous, white rhododendron is one of our tallest (to 2 m, 7 ft) subalpine zone shrubs. Coarse reddish hairs cover young twigs, lower leaf surfaces, and calyx. The thin, elliptical to inversely lance-shaped leaves up to 8 cm (3 in) long have entire to undulating margins and dark green upper and lighter lower surfaces. They are clustered at stem tips and appear to be whorled. The 1-4 bell-shaped, white flowers develop from lateral buds and blossom in the latter part of July.

Similarities in general size, growth pattern and leaf shape cause confusion between *menziesia* and white rhododendron, but leaves of rhododendron are a shiny green, while those of *menziesia* are dull blue-green. Close inspection will reveal a mucronate tip. Elevational range of both species is roughly 1675-2225 m (5,500-7,300 ft) on wooded north- and east-facing slopes. *Menziesia* is usually the undergrowth dominant except at the highest elevations. Ranging from B.C. south to OR and east to W. MT.

Vaccinium L. Bilberry, Blueberry, Cranberry, Huckleberry

Typically growing in acidic soils, *Vaccinium* spp. are mid-sized to dwarf shrubs with alternate, deciduous leaves, and often angled twigs. Small, urn-shaped flowers are usually borne singly in leaf axils. Fruits are edible, many-seeded berries.

1. Flowers one or more per axil and arising directly from a bud on a twig of the previous year; in bogs, swamps, and lake margins.....(5) *V. occidentale*
1. Flowers usually only one per leaf axil on twigs of the current year.....2
2. Branches bright green or yellow-green with narrow angle between stems, giving a broom-like aspect to plants usually not exceeding 2.50 cm (10 in); leaves <15 mm long; berry a bright red..(3) *V. scoparium*
2. Plants not as above, if branches with narrow angles then leaves >15 mm long.....3
3. Plants over 30 cm (12 in) tall and their branches not narrowly angled.....(1) *V. globulare*
3. Plants less than 30 cm tall or their branches narrowly angled.....3
4. Branches green and angled (not so narrowly as in 2) with leaves widest at or before midpoint (elliptical to lance-shaped to egg-shaped).....(4) *V. myrtillus*
4. Branches not green or sharply angled and leaves widest beyond midpoint (mostly inversely lance-shaped to inversely egg-shaped).....(2) *V. caespitosum*

Group I. This group contains species of upland, well-drained sites that produce the dark blue to purple huckleberries.

1. *Vaccinium globulare* Rydb.

Blue Huckleberry

Younger twigs of this 0.5-1.5 m (20-60 in) tall shrub are slightly angled and yellowish-green, the older ones having grayish and shredding bark. Most leaves are oblong to elliptical, rounded or abruptly acute at the tip, and widest at or below the middle. Lower surfaces are glandular and glaucous. Globe-shaped flowers are pinkish-yellow, developing into bluish-purple berries 6-8 mm broad.

Blue huckleberry, our most common *Vaccinium* spp., is widespread, often dominating the mid-sized shrub layer, especially in successional shrub fields. It occurs from north-facing slopes in the colder portions of the Douglas-fir series to mid-subalpine forests where a common associate is *menziesia*. It is easily confused with and thought to intergrade with *V. membranaceum*, which apparently is absent from our area. From e. WA and OR through ID to MT and nw. WY.

2. Vaccinium caespitosum Michx.

Dwarf Huckleberry

Spreading by rootstocks, dwarf huckleberry is a tufted to mat-forming shrub, 10-25(30) cm (4-10 in) tall, with angular to roundish twigs. Leaves are inversely lance- to egg-shaped and distinctly widest beyond the midpoint with the distal end pointed or blunt. Veins beneath are pronounced. Flowers are twice as long as wide and tubularly urn-shaped. Berries are roundish, dark purple with a bluish waxy bloom.

The berries ripen slightly earlier but are not as flavorful as those of V. globulare; however, bears, birds, and rodents highly prize and immediately harvest them. Dwarf huckleberry is common on well-drained sites of the Douglas-fir series and lower subalpine zone. Its mere presence on a site can denote areas where cold air ponds, such as basins or riverine terraces. It changes to a vivid red before most other shrubs assume fall coloration. Ranging from AK south to CA and east to ID and Rocky Mountains, in Can. to the Atlantic Coast.

Group II. Included here are the grouseberries or bilberries, species with deliciously aromatic, sweet and thin-skinned berries that are too small or uncommon for picking.

3. Vaccinium scoparium Leiberg

Grouseberry, Whortleberry, Grouse Whortleberry

Smaller than other Vaccinium spp., the mat-forming grouse whortleberry is 10-25 cm (4-10 in) tall with numerous, green, erect, and acutely-angled branches that form a broomlike shrub. Leaves are mostly less than 15 mm long, light green, lance- to egg-shaped with small, fine teeth. The elongated bell-shaped flowers are less than 4 mm long and mature to red, globe-shaped, sweet, and aromatic berries.

This is a very common Vaccinium sp. nearly continuous ground cover in open lodgepole pine, whitebark pine, and alpine larch stands. Its occurrence without its common associates, V. myrtillus and menziesia, is indicative of severe subalpine climatic regimes. From B.C. to n. CA east through ID to Alta. and SD and south in the Rocky Mountains to CO.

4. Vaccinium myrtillus L.

Dwarf Bilberry, Low blueberry

Dwarf bilberry looks like a coarser, more woody and less densely branched version of V. scoparium. The branches are narrowly angled and greenish. Leaves are egg- to lance-shaped and have fine, sharp teeth on the margins. Berries are purplish-blue to dark red and lack a waxy bloom.

This is the common "blueberry" of Europe and large areas of northern Asia. It is uncommon here, occurring most often at higher elevations (upper subalpine) intermingled and sometimes apparently intergrading with V. scoparium. It is seldom found fruiting. Circumboreal, in North America from the Rocky Mountains from Alta. to NM and west to B.C. and south on the east side of the Cascades.

Group III. These shrubs occur in bogs (often with Sphagnum moss), swamps, or wet meadows and especially high mountain lake perimeters.

5. Vaccinium occidentale Gray

Western Huckleberry, Western Blueberry

Western blueberry is a small shrub, 20-60 cm (8-24 in) tall, with dense, green stems lacking angles. Leaves are entire, widest beyond midpoint, and lance-shaped. They are distinguished from those of V. caespitosum by the lack of strong cross veins on the lower surface and a whitish, waxy coating. Flowers borne 1-4 per axil. The small, blue, glaucous berries are very acidic and ripen late.

Uncommon in our area, western blueberry is known to form low dense even-topped thickets in wet acid soils of pond margins, often with Sphagnum, throughout the subalpine zones (almost exclusively on non-forest sites). From B.C. south, mostly east side of the Cascades, to nw. CA and east to MT and n. UT.

EUPHORBIACEAE Spurge Family

Euphorbia L. Spurge

Members of this genus include annual and perennial herbs with milky juice and simple leaves. The unisexual flowers are usually borne on the same plant. Flowers of both sexes are greatly reduced. Male flowers, reduced to a single stamen, occur in small clusters surrounded by a calyxlike involucre, a cup-shaped fusion of bracts. Fruits are 3-celled capsules with a single seed per cell.

- | | | |
|----|--|----------------------|
| 1. | All leaves opposite..... | 2 |
| 1. | Leaves, or at least the lower ones, alternate..... | 4 |
| 2. | Plants hairy..... | (7) <u>E. supina</u> |
| 2. | Plants lacking hairs (glabrous)..... | 3 |



e. *Pyrola picta* f. *P. secunda* g. *P. uniflora* h. *Rhododendron albiflorum* i. *Vaccinium globulare*
j. *Vaccinium caespitosum* k. *V. scoparium* l. *V. myrtillus* m. *V. occidentale*

EUPHORBIACEAE

3. Seeds having coarse transverse ridges; leaf margins thickened.....(5) E. glyptosperma
3. Seeds wrinkled or dotted with depressions; leaf margins not thickened.....(6) E. serpyllifolia
4. Plants annual, but taprooted.....(4) E. peplus
4. Plants perennial with a thick woody base.....5
5. Leaves mostly 5 times longer than wide, linear or oblong or narrowly elliptical.....6
5. Leaves mostly <5 times longer than wide, not linear or oblong, rarely elliptical.....(3) E. robusta
6. Leaf width mostly 3 mm or less; length 2 cm or less.....(2) E. cyparissias
6. Leaf width mostly >3 mm; length >2 cm.....(1) E. esula

Group I. This group includes those species with linear to filiform leaves.

1. Euphorbia esula L.

Leafy Spurge

Leafy spurge is a tall (to 90 cm, 36 in) perennial weed growing from deep-seated rootstocks. The erect stems are simple below but branched in an umbrellalike manner above. Leaves of the lower stem are scalelike, those of the upper stem are entire, 2-6 cm long, and oblong to narrowly lance-shaped. Leaves immediately below the flowers are heart- to egg-shaped.

Leafy spurge is possibly the most troublesome of our rangeland weeds. It is difficult to eradicate and greatly reduces pasture productivity. It spreads rapidly from many local populations, such as the hills immediately north of Missoula and the vicinity of Hamilton. This Eurasian weed is well-established in all states of the Northwest.

2. Euphorbia cyparissias L.

Cypress Spurge

Cypress spurge is similar to E. esula in gross aspect, but is much smaller and has narrower leaves 1-3 mm broad.

Though uncommon as a weed of rangelands, cypress spurge has become established in neglected gardens and on roadsides. Possessing many of the same characteristics as leafy spurge, cypress spurge could also become a serious weed. Introduced from Eurasia, it is an occasional weed in ID, WA, OR, W. MT., and ne. U.S.

3. Euphorbia robusta (Engelm.) Small

Rocky Mountain Spurge

Rocky Mountain spurge is a perennial, 10-30 cm (4-12 in) tall, with deep, vertical thickened roots and egg-shaped to oblong, entire, sessile, and somewhat fleshy leaves.

This spurge has been collected on Mount Sentinel but it may no longer occur there. This species of the foothills and lower mountain slopes is common east of the Continental Divide in Montana and extends to SD and south to NM.

Group II. This is an annual with erect stems.

4. Euphorbia peplus L.

Petty Spurge

Petty spurge is glabrous with many-branched stems 10-30 cm (4-12 in) tall. The lower leaves are alternate with egg-shaped and entire blades 1-3 cm long and slender petioles 3-10 cm (1-4 in) long.

This European weed is now common on wasteland in most of North America; collected in gardens north of Missoula.

Group III. These are annuals that usually grow prostrate with much-branched stems thickly set with small, opposite and round-tipped oval to lance-shaped leaves. All species occur on dry, hard, sun-baked soils, often on roadsides.

5. Euphorbia glyptosperma Engelm.

Corrugate-seeded Spurge

This species is distinguished by its seeds which are about 1.2 mm long and grayish, with coarse transverse wrinkles.

Corrugate-seeded spurge occurs on east side of Cascades from B.C. to n. CA east to central states and ME, NY, and N.B.

6. Euphorbia serpyllifolia Pers.

Thyme-leaf Spurge

Thyme-leaf spurge has distinctively pitted and grayish-brown seeds about 1 mm long.

It occurs on dry substrates from the plains to lower mountains east of the Cascades from B.C. south CA and Baja Cal. and east to Alta., MN, NM, and TX.

7. Euphorbia supina Rat.

Milkspurge

Leaves of milkspurge bear a distinctive, elongated, wine-colored spot.

It is native to the e. U.S. and introduced as a weed to the west coast and the university campus in Missoula.

FUMARIACEAE Fumitory Family

Plants in the Fumitory Family include annual, biennial, and perennial herbs with glabrous or glaucous (with a whitish, waxy coating) foliage and watery sap. Leaves are alternate or basal and several times divided. The arresting, irregular (not radially symmetrical) and bisexual flowers have 4 petals and 2 sepals. They are borne in simple or branched inflorescences. Fruits are 2-valved capsules.

Corydalis Medic. CorydalisCorydalis aurea Willd.

Golden Corydalis

Golden corydalis is mostly a biennial or sometimes a winter annual with sprawling, freely branched stems as much as 40 cm (16 in) long. Leaves are highly dissected into ultimate segments mostly 0.5-2.0 mm broad. Flowers have a yellow corolla 12-18 mm long with a spur that is 3-6 mm long.

Golden corydalis has a broad ecological amplitude and a puzzling way of appearing in small populations in a given locale and then disappearing for several subsequent years. Collected on well-drained sites, often near creeks, as above Lolo Creek. Common over much of North America.

Dicentra Bernh. Steer's HeadDicentra uniflora Kell.

Steer's Head

The naked flowering stalk, 5-10 cm (2-4 in) tall, and the 1-several, long-petioled (as long as flower stalk), deeply lobed to divided leaves arise separately from spindle-shaped, fleshy roots. The corolla is white to pinkish with a cordate base and outer petals that are slightly pouched.

Because of its diminutive size and early blooming, Steer's head appears to be less common than it is. It is found on well-drained sites from the foothills to alpine larch forests near timberline. It occurs on East St. Joseph's Peak at 2400 m (7,900 ft), while a larger population is known from Elk Meadows Road near the ID border (1830 m, 6,000 ft). From WA south to the Sierra Nevada of CA and east to ID, WY, and UT.

GENTIANACEAE Gentian Family

The gentian family includes mostly glabrous annual and perennial herbs with bitter juice and simple, entire leaves that are opposite to whorled. Stem leaves lack petioles. The 4-5, purple, blue to white or even greenish petals are united part or nearly all of their length. Flowers are bisexual, radially symmetrical, solitary and terminal, or in clusters. The fruit is a 2-valved capsule with many seeds.

- | | | |
|----|--|-----------------|
| 1. | Corollas tubular, some with the tube flaring into lobes, these not greater than tube length..... | <u>Gentiana</u> |
| 1. | Corollas wheel-shaped with short tube and wide, flaring limb..... | 2 |
| 2. | Style thick, barely 1 mm long; flowers parts in fives..... | <u>Swertia</u> |
| 2. | Style slender, at least 2 mm long; flower parts in fours..... | <u>Frasera</u> |

Frasera Walt. Frasera

Members of this genus are perennial herbs with 1-several flowering stems and opposite or whorled, entire leaves that are joined at their bases. Flowers have wheel- to bell-shaped, 4-lobed, and white or yellowish-green corollas. Flowers are densely aggregated into pyramid-shaped panicles.

- | | | |
|----|--|--------------------------|
| 1. | Stem leaves arranged opposite; pits 1 per petal..... | (1) <u>F. albicaulis</u> |
| 1. | Stem leaves whorled; pits 2 per petal..... | (2) <u>F. speciosa</u> |

1. Frasera albicaulis Dougl.

White-stemmed Frasera

Several, densely short-hairy to glabrous flowering stems, 15-50 cm (6-20 in) tall, arise from a mostly branched caudex. The many basal leaves, 5-30 cm (2-12 in) long, and 1-3 pairs of smaller stem leaves are prominently 3-nerved, white-margined, and narrowly spatula-shaped to linear lance-shaped. Flowers, pale blue to dark blue or purplish, are arranged in a compound, interrupted raceme.



n. *Euphorbia escula* o. *E. cyparissias* p. *E. robusta* q. *E. peplus* r. *E. glyptosperma*
s. *Euphorbia serpyllifolia* t. *E. supina* u. *Corydalis aurea*

White-stemmed fraseria occurs south of Darby on dry, grassy ridges and "bald" ridges at elevations between 1525 m (5,000 ft) and 2135 m (7,000 ft). Typical locations are School Point near West Fork Ranger Station and Sula Peak. From B.C. south on east side of the Cascades to NV and CA, east to ID and W. MT.

2. Fraseria speciosa Dougl.

Green Gentian

The single, coarse and unbranched flowering stalk, to 1.5 m (60 in) tall, arises from a simple caudex. Clustered basal leaves, elliptical to spatula-shaped, are 25-50 cm (10-20 in) long and 3-15 cm (1-6 in) wide, whereas stem leaves are whorled (3-5) and gradually reduced upwards. Flowers with yellowish-green or purple-spotted greenish corollas are borne in a long spikelike inflorescence.

Green gentian is an arresting and unique plant, not easily confused with any other. In our area it is known only from subalpine meadows in the Sapphire Range, a relatively restricted distribution, considering how common it is east of the Continental Divide. From e. WA to the Dakotas, south to CA, NM and n. Mex.

Gentiana L. Gentian

This is a large genus of temperate and arctic regions, most species usually occurring on moist or wet soil. Members are annual, biennial, or perennial herbs from fleshy roots or slender rhizomes. Leaves are opposite, petiolate or clasping, and ours have 4- to 5-lobed, tubular, funnel-shaped, or even elongated bell-shape corollas with folds between the lobes.

1. Plants perennial; corollas folded fanlike between sinuses, generally 5-parted and >>2 cm (0.8 in) long.....3
1. Plants annual, sometimes biennial; corolla not folded fan-like at sinuses, most have corollas <2 cm (0.8 in) long, if longer, then 4-parted or with lacerate or fimbriate lobes.....2
2. Corolla deep blue, usually >2 cm (0.8 in) long and 4-parted.....(5) G. simplex
2. Corollas either <2 cm long or not deep blue and sometimes 5-parted.....(3) G. amarella
3. Corolla greenish-white to yellowish, may be streaked with purple or blue; leaves width about 8 mm or less, blades linear to narrowly lance-shaped and 6 times longer than wide.....(4) G. algida
3. Corolla blue or purple, or if the rare yellow or whitish forms obtain, then less than 6X longer than wide.....4
4. Leaves generally 2 times longer than broad, if at all egg-shaped or inversely egg-shaped then the stem is finely hairy in lines below the leaves.....(2) G. affinis
4. Leaf length mostly less than 2 times width, egg- to inversely egg-shaped.....(1) G. calycosa

1. Gentiana calycosa Griseb.

Mountain Gentian, Explorer's Gentian

Mountain gentian is a glabrous perennial, 10-20 cm (4-8 in) tall, with several erect to decumbent stems that arise in loose tufts from thick, yellowish roots. The conspicuously 3-veined leaves are shiny and range from egg-shaped to broadly elliptical. They are usually less than twice as long as broad. Bright to deep blue, mostly solitary, funnel-shaped flowers are borne at stem tips and in adjacent leaf axils.

Mountain gentian is the only common and widespread, deep blue gentian in our area. Common habitats are moist montane and subalpine meadows and streambanks. It is especially numerous around mountain lakes, and can range to timberline environments as at Carlton Lakes Basin below Lolo Peak.

Color variants, green- or purple-striped flowers, have been collected in the Bitterroot Mountains.

2. Gentiana affinis Griseb.

Pleated Gentian, Prairie Gentian

Pleated gentian is a tufted perennial, 15-30 cm (6-12 in) tall, with leaves, 2-5 cm long, at least twice as long as wide. Those of the stem are mostly narrowly to broadly lance-shaped. The 2-several flowers are solitary on stalks arising from the uppermost leaf axils. Petals are 2.5-4 cm long, mostly deep blue and usually mottled or streaked with green. There are prominent, deeply cleft folds between the corolla lobes.

Pleated gentian is highly variable in structural features, and some forms are similar to G. calycosa; however, G. affinis flowers later and occurs on drier, though still moist, sites. It inhabits open areas ranging from the foothills to the lower subalpine of the Sapphire Mountains and Ross Hole, near Sula. From B.C. south on the the east side of Cascades to CA and AZ, east to Rocky Mountains from Alta. to n. Mex.

3. Gentiana amarella L.

Northern Gentian, Felwort

[Gentianella amarella (L.) Borner]

Northern gentian is an erect, entirely glabrous (except leaf margins and calyx lobes) annual to biennial with numerous, erect branches 5-25 cm (2-10 in) tall. The 3-8 pairs of elliptical to broadly

GERANIACEAE

lance-shaped stem leaves clasp at the base and are as much as 6 cm (2 in) long. Usually numerous, small, tubular flowers, 1-2 cm long, are borne in the leaf axils. Their color is mostly dull purplish-blue but often varies to lavender, pale yellow, and even white.

Northern gentian, a variable, circumboreal species common in meadows and moist areas of Montana's calcareous mountain ranges, is rare in our area. It has been reported from the Sapphire Range and collected near the confluence of South Fork of Lolo Creek and Lolo Creek and in the Woodman School vicinity of lower Lolo Creek Valley, but has not been found in the higher, more interior portions of the Bitterroot Mountains. In w. North America from AK to Mex. and east from Pacific Coast to the Rocky Mountains.

4. Gentiana algida Pall.

White Gentian

White gentian is a tufted, 5-20 cm (2-8 in) tall perennial. Basal leaves are 4-12 cm (1-5 in) long and linear to lance-shaped. The 3-5 pairs on the stem are united at their bases and linear to lance-shaped. Lobes of the narrowly funnel-shaped, white to yellow corolla are blotched or streaked with purple on the outside.

Only 2 small colonies of this alpine, circumpolar gentian are known from our area; they occur in the Bitterroot Mountains above 2745 m (9,000 ft) on the moist, rocky shelves of Bedrock Mountain's northeast slope, and above the Chaffin Lakes Basin. AK to CO.

5. Gentiana simplex Gray

Hiker's Gentian, One-flowered Gentian

[Gentianopsis simplex (Gray) Iltis]

Hiker's Gentian is a small, single-stemmed annual up to 15 cm (6 in) tall. The lowermost stem leaves are only 3-6 mm long; the upper are 10-25 cm (4-10 in) long, oblong with rounded or acute tips. The single, deep blue terminal flower with lobes nearly 1/2 the length of the corolla is borne on a long, naked stalk.

This species was recently collected from the banks of Granite Creek near the Idaho border. It occurs in mountain bogs and meadows of the OR Cascades south to the Sierra Nevada of c. CA and east to c. ID.

Swertia L. Swertia

Swertia perennis L.

Swertia

Short, thick rhizomes give rise to single, erect flowering stems 10-30 cm (4-14 in) tall. The basal leaf blades are narrowly elliptical to inversely egg-shaped and 5-12 cm (2-5 in) long, narrowed to petioles of about the same length. Stem leaves are smaller, sessile, and opposite to alternate. Several 5-petaled, star-shaped, muted bluish-purple flowers are borne terminally in an open inflorescence.

Swertia is locally common in moist to wet subalpine meadows of the Sapphire Range. A circumboreal species; in the w. U.S., it ranges from AK to CA, east through the Rocky Mountains.

GERANIACEAE Geranium Family

Members of the Geranium Family include annual and perennial herbs with alternate or opposite, pungent-smelling and finely dissected leaves that are either pinnately compound or palmately lobed (all lobes originating from a central point at the base). Flowers are bisexual and radially symmetrical with 5 distinct sepals and petals. The prominent style is persistent on the ripening capsule, inspiring the common names "crane's bill" or "stork's bill."

- | | |
|---|-----------------|
| 1. Leaves pinnately compound; fertile stamens 5..... | <u>Erodium</u> |
| 1. Leaves palmately divided or lobed; fertile stamens 10..... | <u>Geranium</u> |

Erodium L'Her. Stork's-bill, Crane's-bill, Filaree

Erodium cicutarium (L.) L'Her.

Stork's-bill

Stork's-bill is a low-growing annual, 3-10 cm (1-4 in) tall, with mostly basal, finely dissected, fern-like, pinnately compound leaves. Plants appear as dense mounds of dark green leaves, often with some bright red or fading leaves beneath. Small magenta-pink flowers, 10-15 mm wide, bloom several times on short stalks in the plant's center; they rapidly mature to "stork's-bill" fruits.

This Old World native was introduced here long ago and has become widespread on drier, disturbed sites (often roadsides) of the western U.S. It is a nutritious and palatable stock feed, especially to sheep. Populations may explode immediately following pasture overgrazing by sheep, such as along Big Creek Road and the Bitterroot Valley near Hamilton.



v. *Dicentra uniflora* w. *Fraseria albicaulis* x. *F. speciosa* y. *Gentiana calycosa* z. *G. affinis*
a. *Gentiana amarella* b. *G. zigada* c. *G. simplex* d. *Swertia perennis*

Geranium L. Crane's-bill, Wild Geranium

Our geraniums are perennial or annual, leafy herbs with hairy foliage, mostly clustered basal leaves and conspicuous appendages at the base of the petioles (stipules). Flowers are showy, with 5 petals and sepals and 10 stamens that change from recurved to spirally coiled by the time fruits have matured.

1. Plants annual or biennial; petal length 8 mm or less.....2
1. Plants perennial; petal length at least 12 mm.....(1) G. viscosissimum
2. Petal length 7-11 mm; carpels smooth or hairy; sepals strongly bristle-tipped.....(6) G. robertianum
2. Petal length mostly <7 mm; carpels usually hairy, if smooth then not bristle-tipped.....3
3. Fertile stamens 5; sepals not bristle-tipped.....(5) G. pusillum
3. Fertile stamens 10; sepals bristle-tipped or not.....4
4. Sepals not bristle-tipped.....(4) G. molle
4. Sepals bristle-tipped.....5
5. Beak of stylar column, including stigmas 4-7 mm long; fruiting pedicel usually much longer than calyx.....(2) G. bicknellii
5. Beak of stylar column, including stigmas mostly under 3 mm long; fruiting pedicel usually slightly, if at all, longer than calyx.....(3) G. carolinianum

Group I. Only one perennial species has been reported, and it occurs throughout our area. Another species, G. richardsonii, is common to the east, but has yet to be found in our area.

1. Geranium viscosissimum F. & M.

Sticky Wild Geranium

Sticky geranium is stout, hairy, and up to 80 cm (32 in) tall. Large basal leaves are up to 30 cm (12 in) long. Glandular hairs of the sepals and flower stalks are yellow-tipped. Flower color is variable, mostly purplish-red to pinkish-lavender. The inner petal surfaces have long, straight hairs.

Sticky geranium is an attractive, common plant of lower elevation grasslands, associated with lupines and balsamroot. It also occurs in wet meadows and open, drier forest types, but it can be found all the way to open timberline sites. Its presence in certain grassland communities is indicative of productive sites. East of Cascade Mountains from B.C. to n. CA, east to Sask. and south to CO, UT, and NV.

Group II. The following six species are annuals, and with exception of G. bicknellii are introduced.

2. Geranium bicknellii Britt.

Bicknell's Geranium

Bicknell's geranium is a white-hairy to glandular annual or biennial with erect to decumbent stems 10-50 cm (4-20 in) tall. Leaf blades are less than 6 cm broad, heart shaped at the base, and deeply palmately divided into mostly 5 wedge-shaped segments. Flowers have bristle-tipped sepals and pinkish petals, notched at the tip.

This native is uncommon in lower elevation woodlands, but it appears after fire in certain forest types. It often colonizes disturbed ground at lower elevations.

3. Geranium carolinianum L.

Carolina Geranium

Carolina geranium is very similar to G. bicknellii, but the former has fruit stalks that are no longer than the calyx.

Broadly distributed across North America this weedy species of waste areas and woodlands has been collected along the railroad tracks in Darby and at Lolo Hot Springs.

4. Geranium molle L.

Dovefoot Geranium

This densely hairy and somewhat glandular annual is low (10-30 cm, 4-12 in) and spreading with kidney-shaped blades that are incised about 1/2 their length into 3-5 lobes. Petals are pink and slightly longer than the sepals.

This is a well-established European weed of moist ground and waste sites. It has been collected near Medicine Hot Springs (valley of East Fork Bitterroot River) and in Missoula gardens.

5. Geranium pusillum Burm.

Small-flowered Geranium

This annual geranium has foliage covered with short, stiff, appressed hairs or glandular pubescence. Stems are erect to prostrate and 10-40 cm (4-16 in) long with heart-shaped to somewhat round leaf blades

that are cleft 1/2-3/4 their length into 5-9 broad, toothed segments. The axils of nearly all the upper leaves bear stalks with two purple flowers.

G. pusillum favors moist or waste areas such as Missoula's Greenough Park. Introduced throughout much of North America.

6. *Geranium robertianum* L.

Robert's Geranium

This obnoxiously aromatic weed has reddish stems and attractive pink flowers.

It has been collected in Missoula's Greenough Park.

GROSSULARIACEAE Gooseberry Family

Ribes L. Gooseberries and Currants

These shrubs have ascending, spreading, prostrate, or erect branches, often with spines at the stem nodes and internodal bristles. The armed species are termed gooseberries and the unarmed ones are called currants. Leaves are alternate, palmately veined, and shallowly to deeply, 3- to 5(7)-lobed and variously toothed. The blade outline is somewhat round with variously shaped bases. Stalked flowers are solitary or arranged in unbranched inflorescences. Individual flowers are subtended by a bract. The calyx consists of a 5-lobed free portion while basally it is united with the ovary to form a hypanthium. The 5 petals are smaller than the sepals, usually narrowed to a clawlike base, and attached to the top of the hypanthium. The fruit is a berry, topped by persistent, dry floral parts.

1. Stems with spines or prickles2
1. Stems lacking spines and prickles.....6
2. Hypanthium (see genus description) saucer- or shallowly cup-shaped.....(4) *R. lacustre*
2. Hypanthium bell-shaped to tubular-bell-shaped or cylindrical.....3
3. Stamens twice or more the length of petals and prominently extended beyond.....(6) *R. inerme*
3. Stamen length about that of petal, not prominently projecting beyond corolla.....4
4. Hypanthium cylindrical, about 3 times longer than wide, 4-6 mm long.....(8) *R. setosum*
4. Hypanthium approximately bell-shaped, not greater than 2 times longer than wide.....5
5. Petals 1-1.5 mm long; leaf blades mostly <15 mm wide; plants gnarled.....(11) *R. hendersonii*
5. Petals 2-4 mm long; leaf blades mostly >15 mm wide; plants mostly erect.....(7) *R. irriguum*
6. Hypanthium tubular-bell-shaped or narrowly cylindrical, mostly longer than wide.....7
6. Hypanthium saucer- to shallowly cup-shaped, mostly wider than long.....10
7. Flowers bright yellow; petal occasionally reddish tinged, smooth, not glandular.....11
7. Flowers not bright yellow; usually hairy or glandular, or both.....8
8. Leaf lobes sharply pointed; underside of blades with stalkless, yellow glands.....(10) *R. americanum*
8. Leaf lobes rounded; leaves lacking glands or glands stalked and not glistening yellow.....9
9. Calyx lobes 1.5-3 mm long, less than 1/2 as long as hypanthium.....(1) *R. cereum*
9. Calyx lobes 3-7 mm long and more than 2 times as long as hypanthium.....(3) *R. viscosissimum*
10. Ovary and leaves copiously studded with stalkless, yellow, and shining glands.....(2) *R. hudsonianum*
10. Ovary lacking glands; leaves only with stalked glands, if any.....(9) *R. sativum*
11. Hypanthium width >10 mm, about twice the length of sepals.....(12) *R. odoratum*
11. Hypanthium width <10 mm, usually less than twice the length of sepals.....(5) *R. aureum*

Group I. These four species are taxonomically distinct and easily identified.

1. *Ribes cereum* Dougl.

Wax or Squaw Currant

Squaw currant is a spreading or rounded, unarmed shrub 0.5- 1.5 m (20-60 in) tall with new branches that are finely hairy, turning grayish- or reddish-brown. Leaves, 15-25 mm wide, are kidney-, wedge-, or fan-shaped and shallowly 3- or 5-lobed with toothed margins. Foliage is glabrous to downy, but usually both leaf surfaces are somewhat glandular. The entire inflorescence is both hairy and sticky; it bears 2-8 greenish-white to white, pinkish-tinged flowers with a nearly cylindrical hypanthium 6-8 mm long. The smooth, bright red berries are bitter and unpalatable.

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The elevational range of squaw currant is as great as its morphological variability. It occurs from dry slopes of the foothills, to ponderosa pine forests, and rocky, south and west exposures in the upper subalpine, where it is the first shrub to exhibit spring green-up. The flowers are an important food source for early arriving hummingbirds. From east slopes of the Cascades, B.C. south to s. CA, east to MT, NE, CO, NM, and AZ.

2. Ribes hudsonianum Richards.

Western or Northern Black Currant

Northern black currant is 0.8-1.8 m (32-70 in) tall, erect, and unarmed. Foliage is covered with round, shining, yellow, stalkless glands, the source of a sweet, pungent and unpleasant odor. The "maple leaf"-shaped leaves, 3-9 cm (1-4 in) wide, are 3-5 lobed, pale and very hairy on lower surface, and sparsely hairy on the upper. Ascending inflorescences bear numerous flowers, each with white sepals and a widely flared and saucer-shaped hypanthium. The black, roundish berries are glabrous to glandular, bitter-tasting, and unpalatable.

This plant depends upon a permanently moist rooting medium, and it is common on a variety of riparian habitats, often paralleling mountain watercourses in the shade of trees and taller shrubs. From AK to Hudson's Bay, south to n. CA, UT, WY, and MN.

3. Ribes viscosissimum Pursh

Sticky Currant

Sticky currant is an unarmed, erect to spreading shrub mostly less than 1.2 m (48 in) tall. The lax, 3- to obscurely 5-lobed and toothed leaves have dense, soft hairs and glands on both surfaces or are sparsely glandular and nearly glabrous. The 3- to 8-flowered inflorescences are erect to slightly drooping, shorter than the leaves, and copiously hairy, with stalked glands. The floral tube (hypanthium) is broadly bell-shaped and about 6 mm long with the oblong lobes that are pointed and slightly shorter than the hypanthium. The bristly-hairy, oval, and blue-black berries, 10-12 mm long, are disagreeable in taste and smell.

Sticky currant is not tolerant of wet substrates, but it is common on moist to dry mountain slopes, being most common on north- and east-facing slopes, from the montane to the upper subalpine zone. It may be an important component of early-successional cut-over lands. Mostly on east side of the Cascades from B.C. to nw. CA and n. AZ and east to MT, w. WY, nw. CO.

4. Ribes lacustre (Pers.) Poir.

Swamp Gooseberry, Prickly Gooseberry

Prickly gooseberry is a somewhat erect shrub with stems that are sparsely to densely set with slender, sharp prickles between the nodes, while the nodes are armed with several larger spines. Leaves, 2-5 cm broad and somewhat "maple-leaf"-shaped, are mostly 5-lobed with 1-2 series of rounded to pointed teeth. Leaf surfaces are glabrous to sparsely hairy along the veins, never glandular. The upper surface is deep green and so glossy as to have a "dipped in honey" appearance. The 6-15 flowers, with pink to reddish fan-shaped petals, are borne in a drooping cluster. The hypanthium is short (about 1 mm long), saucer-shaped and lined with a pinkish disk on which the petals are inserted. Berries are dark purple with stalked glands and are barely palatable.

Like R. viscosissimum prickly gooseberry is both common and distributed along a broad elevational range, from the foothills and lower timberline to open alpine boulderfields; always on moist to wet substrates. It occurs most abundantly on moist slopes or bordering reaches of riparian habitat. At lower elevations it grows in considerable shade and looks like other currants, but at higher elevations, on rockslides and boulderfields, stems are stout, dwarfed, and densely armed with robust spines. From AK to the Atlantic Coast, south to CA, UT, CO, SD, MI, and PA.

Group II. These four Ribes spp. have a wide, but scattered distribution. They occur mostly as single plants or small groups.

5. Ribes aureum Pursh.

Golden Currant

Golden currant is an erect or rounded, unarmed shrub, 1-2 m (40-80 in) tall, with reddish and glabrous to finely hairy young stems that age to glabrous, dark gray. Leaves, mostly 3-lobed to less than 1/2 their length, have broad wedge- to heart-shaped bases. The 5-18 fragrant flowers are borne in ascending inflorescences that equal or exceed the highest leaves. Flowers have a golden yellow, glabrous calyx with spreading lobes, yellow to orange or reddish petals, and a narrowly tubular hypanthium. The round, glabrous berries are red to black or even yellow.

Foliage of this species turns a warm yellow in autumn. This is the only native Ribes spp. of ornamental value. The glabrous, red to black berries are edible, especially in jams. It is known from river valley floodplains, stream banks, and moist ravines of the lower foothills. From the east slope of the Rocky Mountains, Alta. to NM and east to the Atlantic Coast.

6. Ribes inerme Rydb.

White-stemmed Gooseberry

White-stemmed gooseberry is a sprawling shrub, less than 1.5 m (60 in) tall, with grayish (deep red under-surface), flaky, and mostly smooth bark except for occasional thin bristles and, more infrequently,



e. *Erodium cicutarium* f. *Geranium viscosissimum* g. *G. bicknellii* h. *G. carolinianum* i. *G. molle*
j. *Geranium pusillum* k. *Ribes cereum* l. *R. hudsonianum*

GROSSULARIACEAE

1-3 nodal spines. Leaves are hairless (except for margins) and have blades that are 5-lobed at least halfway to the center with toothed margins. They are generally wider than long. The 2-4 flowers have a tubular to bell-shaped hypanthium, 3 mm long, and are arranged on drooping, glabrous inflorescences. The berries are smooth, 7-9 mm in diameter, reddish-purple, and unpalatable.

This species is locally common from valley riparian sites to moist, often protected lower mountain slopes and meadows. On east slopes of the Cascades from B.C. south to the n. Coast Range and s. Sierra Nevada, east to MT, WY, CO, and NM.

7. Ribes irriguum Dougl.

Idaho Gooseberry

[R. oxycanthoides var. irriguum]

This gooseberry has similar leaves, flower shape, and habitat as R. inerme, but differs by having bristly (sometimes densely so) stems, regularly armed with stiff, 1 cm long nodal spines. Flowers are more distinctly bell-shaped. Leaves are usually finely hairy on both surfaces but may be glabrous or with hairs only on the margins. The round, bluish-purple, unpalatable berry is about 1 cm in diameter.

This species overlaps in habitat with R. inerme and extends to drier slopes as well. It is easily confused with R. inerme, R. hendersonii and R. oxycanthoides. From ne. OR and adjacent WA, east to w. MT and se. B.C., not east of Continental Divide.

8. Ribes setosum Lindl.

Missouri Gooseberry

[R. oxycanthoides var. setosum]

This shrub, 0.5-1(2) m (20-40 in) tall, with spreading, slender, arched branches, is the most stoutly armed of our Ribes spp. The internodes are usually densely bristly (to lacking) and nodes have 1-5, straight to recurved spines up to 1.5 cm (0.6 in) long. Leaves, with blades lobed 1/2 their length into 5 wedge shapes, are glabrous to finely hairy on upper surfaces and usually finely hairy and glandular on the lower. The 1- to 3-flowered inflorescences are much shorter than the leaves. The hypanthium is columnar with spreading to recurved lobes. The 10-12 mm long, purple-black berries are the most flavorful of our gooseberries.

The elevational range of Missouri gooseberry stretches from foothills to the high subalpine. In our area it is associated with dry sites, south slopes, bedrock outcrops, and rockslides. From c. and e. ID north through MT to Alta. and south to WY, east to MI.

Group III. Species escaped from cultivation.

9. Ribes sativum (Reichb.) Syme

Common Currant

[R. rubrum L.]

This unarmed currant, 1.5 m (70 in) tall, is crisp-hairy and glandular on the young growth, while the old bark is reddish-brown. The "maple-leaf"-shaped leaves are mostly 4-8 cm (1-3 in) broad and sparsely hairy on veins of the underside. The hypanthium is saucer-shaped and about 1 mm long. The red berries are edible, but sour.

The common currant, a European native, has established in several moist to wet places, such as along irrigation ditches near St. Mary's Road and the moist meadows south of Lolo.

Group IV. This group contains species that are rare in our area.

10. Ribes americanum Mill.

Black Currant

Black currant is an erect to spreading shrub, less than 1 m (40 in) tall, with branches that are densely covered by yellowish, stalkless, shining glands that age to gray-black. Stalkless glands and coarse hairs thickly cover at least lower surfaces of leaves that are incised about 1/2 their length into 3 prominent lobes (sometimes 2 lesser ones). A cream to greenish-white calyx with oblong to spatula-shaped lobes crowns a tubular to bell-shaped hypanthium. The smooth, egg-shaped, 1 cm long berries are not palatable.

This species has been collected along Bitterroot River near Missoula. Mostly from eastern edge of Rocky Mountains eastward to the Atlantic Coast; at the western edge of its range in our area.

11. Ribes hendersonii Hitch.

Henderson's Gooseberry

[R. oxycanthoides var. hendersonii]

This gooseberry is distinct in form; it is usually less than 80 cm (30 in) tall, sprawling, and densely branched. Older specimens are gnarled and gray-barked. The prominence of the 1-7, rigid and yellow nodal spines is accentuated by the diminutive heart- to kidney-shaped leaves that are glandular and minutely pubescent. Short inflorescences support 1-2 flowers that have a 2.5 mm long, bell-shaped hypanthium. Reddish, glabrous fruits are about 10 mm in diameter.

This shrub occurs at higher elevations on rockslides and outcrops in the southern part of the Sapphire Mountains. Found in the Lost River, Lemhi, other mountain ranges of eastern ID and the Anaconda, Beaverhead, Flint Creek, and Rocky Mountain Front in MT.



m. *Ribes viscosissimum* n. *R. lacustre* o. *R. aureum* p. *R. inerme* q. *R. irriguum* r. *R. setosum*
 s. *Ribes sativum* t. *R. americanum* u. *R. hendersonii*

HALORAGACEAE

12. Ribes odoratum Wendl.

Golden Currant

[R. aureum Pursh var. villosum D.C.]

This golden currant is very similar to R. aureum.

It is native to the east slope of the Rocky Mtns in WY and eastward and is probably introduced in our area. It was found along the Clark Fork River in Missoula. (Not illustrated).

HALORAGACEAE Water Milfoil Family

Myriophyllum L. Water Milfoil

These are floating, rootless, aquatic perennials with slender stems. Submersed leaves are dissected into many fine, comblike divisions, while the greatly reduced emergent leaves may be dissected or undivided. Unisexual flowers are borne singly in the axils of upper leaves, the male flowers above the females. Each flower has 4 small petals that quickly fall after opening, and the 4-lobed calyx surrounds the ovary. There are 4 or 8 stamens. The fruit splits into 4 nutlike achenes.

1. Flowers borne in a spikelike inflorescence with reduced, bractlike leaves.....(1) M. spicatum
1. Flowers borne in the axils of unreduced stem leaves.....(2) M. brasiliense

1. Myriophyllum spicatum L.

Spiked Water Milfoil

The plant has simple or branched stems up to 1 m (39 in) long with 3-4 leaves, 1-4 cm long, whorled at each node. Flowers are borne in an interrupted, terminal, usually emergent spike up to 10 cm (4 in) long. The flowers and fruits are larger than the subtending, bractlike, entire to minutely toothed leaves.

Spiked water milfoil is locally very common in standing or slow moving water of ponds, rivers and sloughs in the valleys. Our plants are var. exallescens (Fern.) Jeps. Throughout much of North America; Eurasia.

2. Myriophyllum brasiliense Camb.

South American Water Milfoil

South American water milfoil has stems up to 90 cm (3 ft) long and 4-6 leaves, 2-3 cm long, with hairlike divisions, whorled at each node. Flowers are borne in the axils of submersed leaves.

This species has been collected in a pond southeast of Missoula. Introduced from South America throughout much of the world.

HIPPURIDACEAE Mare's Tail Family

The family includes aquatic and amphibious, perennial herbs with simple, sessile, entire, linear, and whorled leaves. The flowers bear both sexes with an ovary fused to an obscurely lobed calyx but lacking a corolla.

Hippuris L. Mare's Tail

Hippuris vulgaris L.

Common Mare's Tail

This smooth perennial has extensive, creeping rhizomes with erect branches 5-30 cm (2-12 in) tall. The leaves, 1-2 mm by 10-35 mm, are arranged 6-12 per whorl.

Common mare's tail usually occurs at least partly submerged in shallow water of bodies from lakes to ponds to streams. Circumboreally distributed, southward in North America to CA, NM and central and ne. states.

HYDRANGEACEAE Hydrangea Family

Philadelphus L. Mockorange, Syringa

Philadelphus lewisii Pursh

Mockorange, Syringa

Mockorange is a tall, erect to spreading, deciduous shrub up to 3 m (10 ft) tall. The opposite, egg-shaped and smooth to stiffly hairy leaves have a few to many rounded teeth and 3 distinct veins. The white flowers, 10-25 mm long, are sweetly-scented.

A common species, more abundant in the Bitterroot than the Sapphire Mountains. It occurs mostly in the foothills and montane zone, often in open ponderosa pine and Douglas-fir dominated forests and on both dry, rocky, moist streamside habitats. From B.C. to n. CA and inland to n. and central ID and w. MT.

HYDROPHYLLACEAE Waterleaf Family

The Waterleaf Family includes annual and perennial herbs with leaves that are mostly alternate, rarely opposite, or entirely basal. They are simple or divided and entire to coarsely toothed. Radially symmetrical, 5-parted flowers with funnel- or bell-shaped corollas are solitary or borne in open or crowded, branching inflorescences. Fruit is a capsule.

1. Flowers arranged singly or in a few-flowered, terminal inflorescence.....2
1. Flowers not solitary, in definite inflorescences.....3
2. Leaves entire or barely toothed.....Hesperochiron
2. Leaves coarsely toothed to pinnately divided.....Nemophila
3. Leaves mostly all basal, the blade kidney-shaped to roundish, palmately lobed or coarsely toothed, the lobes or teeth rounded.....Romanzoffia
3. Leaves not as above.....4
4. Plants with fibrous roots, the main branches thick; flowers densely arranged in a headlike (globose) cluster below leaf blades.....Hydrophyllum
4. Plants taprooted; inflorescence rarely ball-like when expanded and always above leaves.....Phacelia

Hesperochiron Wats. HesperochironHesperochiron pumilus (Griseb.) Porter

Dwarf Hesperochiron

This small taprooted perennial, less than 6 cm (2 in) tall, lacks a main stem but produces rhizomes from the short above-ground root crown. Single flowers are borne on short basal stalks. The leaves are glabrous and spatula- or lance-shaped, on short petioles. Several to many white flowers are reddish- to purple-veined.

This attractive plant occurs in some canyons of the southern Bitterroot Mountains. It is found in seepage areas of open or wooded slopes and areas that have abundant moisture in the spring such as Fales Flats on the Nez Perce Fork of the Bitterroot River. From WA south to CA, wholly east of the Cascades to ID, MT, UT, CO, and AZ.

Hydrophyllum L. WaterleafHydrophyllum capitatum Dougl.

Ballhead Waterleaf

Ballhead waterleaf has stems, 10-40 cm (4-16 in) tall, from a deep-seated, short rhizome. The few large leaves have blades up to 15 cm (6 in) long that are pinnately divided almost to midrib and extend beyond the round flower clusters. The stamens project much beyond the white, lavender, or purplish-blue corollas.

Ballhead waterleaf blooms early in the spring, slightly after the more numerous glacier lily and shooting stars, but its herbage does not wither so quickly. It occurs on moist, montane to lower subalpine woodlands (in sun or shade), or in moist meadows. From s. B.C. and Alta. south to c. CA and CO almost exclusively east of the Cascade Range.

Nemophila Nutt. NemophilaNemophila breviflora Gray

Nemophila

The weak, angled, prostrate to ascending stems, to 20 cm, 8 in tall, are sparsely set with prickles. Leaves are fringed with stiff hairs, alternate, and pinnately cleft into 2 pairs of oblong to lance-shaped lobes. The corolla is up to 3 mm long, bell-shaped, lavender colored, and not longer than the calyx lobes.

Nemophila is an uncommon species, collected at Fales Flats near the Nez Perce Fork of the Bitterroot River. Distributed wholly east of the Cascades from B.C. to n. CA, east to MT and CO.

Phacelia Juss. Scorpion Weed, Phacelia

Phacelias include herbaceous annuals, biennials, and perennials with alternate leaves and various degrees of pubescence. The 5-parted flowers have stamens extending beyond the corolla and are arranged in inflorescences that are spirally coiled and congested at first but elongate with maturity. Flowers bloom progressively from base to tip.

1. Leaves all entire, or nearly so, or some with 1 or 2 pair of entire lobes or leaflets below middle...2
1. Leaves coarsely toothed or pinnately lobed or divided.....4
2. Ovules 6 or more per ovary; plants annual.....(1) P. linearis
2. Ovules 4 per ovary; biennial or perennial.....3
3. Plants usually having a single, erect stem from a taproot, occasionally with several lesser stems; some leaves lower on stem with leaflets at base of blade; foliage not silver/gray-hairy.....(3) P. heterophylla
3. Plants usually with several suberect, somewhat equally long stems from a branched caudex; leaves mostly entire; foliage mostly silver/gray-hairy.....(4) P. hastata
4. Stamens included, shorter than or equal to corolla.....(1) P. linearis
4. Stamens projecting beyond tip of corolla.....5
5. Plants perennial with a branched caudex.....(5) P. lyallii
5. Plants annual or biennial with a simple taproot.....(2) P. franklinii

Group I. This is our only annual species.

1. Phacelia linearis (Pursh) Holz.

Sand Phacelia

Sand phacelia is mostly less than 30 cm (12 in) tall with simple or highly branched and densely short-hairy stems. Leaves are confined to the main stem. They are sessile or with short petioles, less than 10 cm (4 in) long, and lobed into 1-4 divergent, narrow segments. Showy, bright blue, broadly bell-shaped flowers are borne in narrow axillary inflorescences.

Sand phacelia is very common on lower elevation, dry sites, especially in ponderosa pine forests. Mostly east of the Cascades from s. B.C. and Alta. to n. CA, UT, and WY.

Group II. In our area these species are usually biennial (occasionally annual).

2. Phacelia franklinii (R.Br.) Gray

Franklin's Phacelia

This biennial is 15-50 cm (6-20 in) tall and usually has a single, unbranched and erect stem that may be ringed by several lesser stems. Herbage is glandular-hairy. Leaves, both of the basal rosette and the stem, are pinnately divided and less than 9 cm (4 in) long by 5 cm (2 in) wide. Inflorescences bearing blue-purple flowers arise from leaf axils along the stem's length.

This attractive plant has been collected north of Missoula in the Rattlesnake Valley, in the southeastern part of the Sapphire Range, and Ross' Hole in southern Ravalli County. It usually occurs on gravelly soils of lower to middle elevations. From w. MT to n. WY and c. ID, north to Yuk. and east to Lake Superior.

3. Phacelia heterophylla Pursh

Virgate Phacelia

A taprooted biennial or perennial, to 50 cm (20 in) tall, it has a single, sturdy, erect stem often ringed by several ascending smaller stems. It is so densely hairy (both short lax and longer bristles) and glandular that the herbage can appear grayish-green. Leaves usually have 1-2 pairs of lateral lobes at the blade's base. The greenish-white, yellowish, or purplish flowers are borne in an elongated, narrow, densely bristly, and short-hairy inflorescence.

This is a species of dry sites, roadsides to rockslides, in the valleys and foothills, rarely found above 1675 m (5,500 ft). From s. B.C. south to c. CA, AZ, and NM, east to MT.

Group III. These are true perennials.

4. Phacelia hastata Dougl.

Silverleaf Phacelia

Usually several prostrate to almost erect stems, up to 60 cm (24 in) tall, originate from a taproot and branched caudex. Herbage is silvery due to the dense, fine, short hairs. Leaves are all entire or rarely with a small lateral lobe. The short, condensed inflorescence bears flowers with white to lavender or purplish corollas.

Two varieties are recognized: var leptosepala (Rydb.) Cronq. has erect or ascending stems approaching 15 cm (6 in) tall and flowers that are all dull yellow. Normally, it does not occur above 1830 m (6,000 ft). Var. alpina (Rydb.) Cronq., the alpine phacelia, has prostrate stems, generally not over 15 cm (6 in) long and lavender to dull purple flowers. It is widely distributed from the foothills to above timberline, mostly on south- or west-facing slopes. Both varieties grow mostly on sandy or gravelly, dry mineral substrates. From s. B.C. and Alta. to CA and east to CO and w. NE.



v. *Myriophyllum spicatum* w. *M. brasiliense* x. *Hippuris vulgaris* y. *Philadelphus lewisii*
z. *Hesperochiron pumilus* a. *Hydrophyllum capitatum* b. *Nemophila breviflora* c. *Phacelia linearis*

HYPERICACEAE

5. Phacelia lyallii (Gray) Rydb.

Lyall's Phacelia

Lyall's phacelia is a several-stemmed perennial, up to 25 cm (10 in) tall with sparsely hairy and glandular foliage. Leaves are very coarsely few-toothed to pinnately lobed. Those near the base are short-petioled and about 10 cm long, whereas those of the upper stem are sharply reduced in number and size and lack petioles. The corolla is deep blue-purple to violet with stamens extending much beyond it.

Lyall's phacelia is found on talus slopes and in rock crevices on north- and east-facing slopes near or above timberline. It is distributed in the Bitterroot Mountains from the Pyramid Buttes southward on most high ridges. Its distribution is mainly confined to W. MT and Alta.

Romanzoffia Cham.

Romanzoffia sitchensis Bong.

Mist Maiden

In gross appearance, mist maiden, a glabrous perennial, resembles some species of saxifrage. It is up to 15 cm (6 in) tall with only basal leaves. These have petioles, 15 cm (6 in) long, bulblike thickened bases, and kidney-shaped, shallowly lobed blades. The delicate, white, 5-lobed and bell-shaped flowers are arranged on naked stalks, projecting much above the leaves.

This uncommon plant occurs on moist to wet rock outcrops and ledges within the alpine zone of the southern Bitterroot Mountains. It is known from the north face of West Como Peak and Mount Jerusalem at over 2800 m (9,200 ft) and north slopes of White Mountain and Sugarloaf Peak at 2530-2650 m (8,300-8,700 ft). AK to CA, east to Alta. and MT.

HYPERICACEAE St. John's-wort Family

Hypericum L. St. John's-wort

Four perennial species occur in our area, all with undivided, opposite and sessile leaves. All flowers are yellow, bisexual, and radially symmetrical. There are 5 sepals and petals. Fruits are capsules with 1 or 3 chambers.

1. Petals mostly <6 mm long and scarcely longer than the sepals and lacking black dots along the margin.....2
1. Petals mostly >6 mm long and usually much longer than sepals, or blackish glandular (dotted) along the margins.....3
2. Stems erect, over 10 cm (4 in) tall; leaves usually <1.5 cm long.....(4) H. majus
2. Stems trailing, matted; leaves usually >1.5 cm long.....(3) H. anagalloides
3. Sepals mostly triangular, less than 3 times as long as wide; moist areas.....(2) H. formosum
3. Sepals mostly linear to lance-shaped, 3-5 times as long as wide; disturbed areas.....(1) H. perforatum

1. Hypericum perforatum L.

Goatweed

Goatweed is a taprooted perennial with short rhizomes and many-branched stems 30-80 (12-32 in) tall. Leaves are narrowly spatula-shaped to inversely lance-shaped, connected basally by winglike structures, and purplish-black dotted. The numerous flowers of the compound inflorescences have conspicuously black-dotted margins and petals that are twice as long as the sepals.

Goatweed is an introduced, European weed that is difficult to eradicate and has become a problem in places, but not to the degree experienced in the Pacific Coast states and CO. Poisonous to livestock, but with a bitter taste, it is grazed only when animals are starving.

2. Hypericum formosum H.B.K.

Western St. John's-wort

Western St. John's-wort is a glabrous perennial with many simple, erect stems, mostly less than 40 cm (16 in) tall, that arise from creeping rhizomes. Leaf margins are dotted with minute purple-black glands and are egg- to lance-shaped. The few flowers have yellow, elliptical petals, twice the length of sepals. They are borne on stalks at or near the tip of the stem.

This species is most common on north-facing slopes in the wetter, northern portion of the Bitterroot Mountains. We have two varieties: the common and shorter (less than 20 cm, 8 in) one, var. nortoniae (Jones) Hitchc. is typical of subalpine and timberline environments. Var. scouleri (Hook.) Hitchc. is taller, with branched stems and occurs at lower elevations. From B.C. to Baja CA, east to MT, WY, and C. Mex.

3. Hypericum anagalloides C. & S.

Bog St. John's-wort

Bog St. John's-wort is a dwarf, creeping perennial forming dense mats from stems that root at their nodes. Some stems are nearly erect, 5-10 cm (2-4 in) high and branched above. The egg-shaped to elliptical



d. *Phacelia franklinii* e. *P. heterophylla* f. *P. hastata* g. *P. lyallii* h. *Romanzoffia sitchensis*
i. *Hypericum perforatum*

LABIATAE

leaves, 5-15 mm long, barely clasp the base. The small, strikingly attractive, and upturned flowers are 2-4 mm across and have yellow petals that are slightly longer than the sepals.

All the known collections of bog St. John's-wort come from the vicinity of Lost Horse Creek, the central portion of the Bitterroot Mountains, but the species is known to occur in moist montane to subalpine meadows from B.C. to Baja Cal. and east to MT.

4. Hypericum majus (Gray) Britt.

Canada St. John's-wort

Canada St. John's-wort is a short-lived perennial and less than 25 cm (10 in) tall. It has short rhizomes and grows erect, forming small, open colonies. Leaves are oblong to lance-shaped, without black dots. Petals and sepals of the pale yellow, inconspicuous flowers are about equally long.

All of our collections have been made south of Lolo at various channels and sloughs of the Bitterroot River floodplains, in habitats that are wet or moist only in the spring. Eastern North America, sporadic and rare in the west.

LABIATAE (LAMIACEAE) Mint Family

Mints are herbs with 4-angled stems and usually opposite (or whorled) leaves, dotted with glands secreting aromatic oils. Flowers are bisexual and bilaterally symmetrical; our members nearly always have a 2-lobed corolla.

1. Stamens bearing 2 anther sacs.....2
1. Stamens bearing 4 anther sacs.....4
2. Corolla nearly radially symmetrical and 4 lobed; flowers densely clustered in leaf axils.....Lycopus
2. Corolla 2-lipped (bilaterally symmetrical) and usually 5-lobed; flowers various.....3
3. Leaflike bracts below the flowers abruptly narrowed to a long point.....Salvia
3. Bracts without a long point.....Monarda
4. Calyx teeth 10, hooked at the tip; stems nearly always white-woolly.....Marrubium
4. Calyx teeth 5 or fewer, not hooked at tip; stems not white-woolly.....5
5. Corolla radially symmetrical or nearly so, 1.5-7 mm long.....Mentha
5. Corolla bilaterally symmetrical, mostly 2-lipped, 3-30 mm long.....6
6. Calyx 2-lipped, the lips entire with an appendage on upper side, near middle; flowers solitary in leaf axils.....Scutellaria
6. If calyx 2-lipped then obvious teeth on at least one lip, lacking appendage on upper lip; flowers various.....7
7. Tooth of upper calyx 2 times or more as wide as others.....Dracocephalum
7. Tooth of upper calyx <2 times as wide as others.....8
8. Plants annuals.....9
8. Plants perennials.....10
9. Leaf blades mostly widest near base, lance- to egg-shaped.....Galeopsis
9. Leaf blades roughly triangular to heart-shaped to almost round.....Lamium
10. Inflorescences in leaf axils and overtopped by leaves.....11
10. Inflorescences at stem ends and not overtopped by leaves.....13
11. Leaves deeply and sharply lobed.....Leonurus
11. Leaves having rounded teeth.....12
12. Upper pair of stamens longer than lower pair; flowers longer than pedicels, several per axil...Glechoma
12. Upper pair of stamens equaling or shorter than lower pair; flowers solitary, shorter than pedicels.....Satureja
13. Anther sacs parallel (nearly so) and glabrous (nearly so).....14
13. Anther sacs widely divergent or placed end to end, occasionally with hairs on margins.....15
14. Leaves lacking petioles; stamens mostly not extending beyond corolla lips.....Physostegia
14. Leaves with petioles, stamens prominently extending beyond corolla.....Agastache
15. Leaf margins nearly completely lacking teeth or lobes.....Prunella
15. Leaves toothed.....16

16. Calyx with 15 raised nerves and non-glandular hairs <1 mm long (non-stalked glands may be present).....Nepeta
16. Calyx lacking 15 raised nerves but having some stalked, glandular hairs, over 1 mm long.....Stachys

Agastache Clayton Horsemint, Giant-hyssop

Agastache urticifolia (Benth.) Kuntze

Nettle-leaved Horsemint

Nettle-leaved horsemint is a fibrous-rooted perennial with multiple stems, up to 1.5 m (60 in) tall. Leaves are triangular to somewhat heart-shaped and resemble those of stinging nettle. The flowers, with white corolla and purplish-tinged calyx, are crowded into a dense, whorled, and spikelike inflorescence.

This plant has a strong minty fragrance. It is common in lush meadows from the foothills to the subalpine. From se. B.C. and MT south to CO and CA (where it reaches the coast).

Dracocephalum L. Dragonhead

Dracocephalum parviflorum Nutt.

Dragonhead

The solitary or clustered stems of this biennial or short-lived perennial are up to 60 cm (24 in) tall and rise from a taproot. Lower stem leaves are reduced and wither early. The stalked, upper leaves are lance-shaped or oblong to elliptical with spine-tipped teeth. The terminal inflorescence of small purple flowers is dense and spikelike, with distinctive bracts that are large, prominently veined, and toothed with a stiff bristle at the tip.

Dragonhead occurs in open, low-elevation moist sites. It has been collected near Missoula, at Medicine Hot Springs and in the foothills of the Sapphire Range. From s. B.C. to n. OR and east through most of ID to s. Sask., w. MN and w. NE.

This plant requires disturbance, such as fire or scarification, to germinate.

Galeopsis L. Hemp Nettle

Galeopsis tetrahit L.

Hemp Nettle

This annual has simple or branched stems, up to 50 cm (20 in) tall. Spreading, bristlelike hairs and stalked glands cover leaves and stems and are especially long and dense below the upper nodes. Leaves have petioles and blades with coarse, blunt teeth. Pinkish-purple flowers are borne in whorls and are sessile in upper leaf axils, the uppermost subtended by much reduced leaves. The prominently nerved calyx has 5 firm, spiny lobes.

Hemp nettle is native to Europe and occurs here as a weed of meadows and other moist sites. A large population is known from North Kootenai Lake trail, and it is not uncommon around Big Creek Lake and along several trails in the northern portion of the Bitterroot Mountains. Otherwise it is an occasional garden weed in the Bitterroot Valley and Missoula. Known from n. ID, w. WA, and s. B.C.

Glechoma L. Ground Ivy

Glechoma hederacea L.

Ground Ivy

This plant is a lax-stemmed to prostrate, rough to the touch, perennial. It sprouts from slender, ground-hugging and nodally rooting stems or shallow rhizomes. The glabrous or hairy leaf blades are bluntly heart-shaped to kidney-shaped, with rounded teeth. A few violet-blue flowers are whorled in leaf axils.

Ground ivy is a common garden weed native to Eurasia. In our area it thrives in the protection of shrubs of gardens and parks, surviving without irrigation. It is now well-established across the U.S.

Lamium L. Henbit

Our representative of this genus are all weedy annuals of Eurasian origin. Several ascending, decumbent or semi-prostrate stems sprout from short, weak taproots. Pinkish-purple flowers are whorled in axils of ordinary or modified leaves (bracts).

1. Leaves subtending lowest flower clusters are sessile; hair of galea purple or rose.(1) L. amplexicaule
1. Leaves subtending lowest flower clusters have petiole; galea hairs usually white.....(2) L. purpureum

LABIATAE

1. Lamium amplexicaule L.

Common Henbit

Common henbit has petiolate leaves that are rounded to cordate with shallow, rounded teeth on the margins. The flowers are borne mostly on the lower portion of the stem. Leaflike bracts subtending the flower clusters are broad-based, sessile, and clasping.

Common henbit is a ubiquitous weed of fields and waste places; well established in North America.

2. Lamium purpureum L.

Red Henbit

All leaves of red henbit have petioles and rounded teeth or serrations. Those of lower stem have a broader base and are separated by 1-few elongated internodes from the upper leaf pairs that are more heart-shaped with shorter petioles.

The weedy red henbit has a spotty distribution across the U.S.

Leonurus L. Motherwort

Leonurus cardiaca L.

Motherwort

Motherwort is a fibrous-rooted perennial with several stems, 0.5-1.5 m (20-60 in) tall, from a short rhizome or rootstock. All leaves are borne on the stem and are palmately cleft and coarsely toothed. They are gradually reduced and less divided above so that uppermost ones are small and often entire. The pale pink flowers have an upper lip that is prominently white-hairy. They are densely whorled in the axils of the upper leaves.

Motherwort, an Asian weed, is a frequent feature of our gardens and fields but is only sporadically established across the U.S.

Lycopus L. Water Horehound, Bugleweed

Water horehounds are native, non-aromatic, rhizomatous perennials with all leaves set on the main stem, which is usually simple or occasionally branched. The white or pinkish-purple flowers are small, without stalks, and whorled in the axils of reduced upper stem leaves. Habitat is commonly wet to moist substrates of lake shores and river banks.

1. Calyx lobes blunt or bluntly acute, not longer than the mature seeds.....(3) L. uniflorus
1. Calyx lobes tapered to a long point, surpassing the mature seeds.....2
2. Leaves with short petiole, irregularly incised to toothed or pinnately divided; calyx lobes somewhat awn-tipped; seeds mostly <1.5 mm long.....(1) L. americanus
2. Leaves sessile or nearly so and having coarsely serrate margin; calyx lobes merely pointed; seeds mostly >1.5 mm long.....(2) L. asper

1. Lycopus americanus Muhl.

Water Horehound

Stems, 20-60 cm (8-24 in) tall, arise from sturdy rhizomes. Leaves with short petioles and irregular, slender teeth or pinnate lobes, arise from a hairy base. Corollas are white and 2-3 mm long.

Our most common water horehound, encountered frequently on the shores of the Bitterroot River. From B.C. east to Newf., south to CA and FL.

2. Lycopus asper Greene

Rough Bugleweed

Stems are 20-80 cm (8-32 in) tall with spreading hairs along the 4 angles. They arise from thickened, tuberlike rhizomes. Leaves are broad-based, without petioles, and coarsely toothed. Flowers are white and 3-5 mm long.

Rough bugleweed has been collected only along the Clark Fork River. It is uncommon here but more common in eastern MT on alkaline flats. Wholly east of the Cascades, from s. B.C. to CA, east to CO, IA, MN, and Sask.

3. Lycopus uniflorus Michx.

Northern Bugleweed

This plant has distinct tubers and solitary stems that are slightly roughened and finely hairy with slender runners near the base. Leaf petioles are very short or nearly absent. Leaf blades have irregularly spaced, coarse, outward or forward directed teeth. The white or pinkish corolla, 3.5-5.5 mm long, is distinctly longer than the calyx.

Our collections were taken on the banks of Miller Creek, south of Missoula. From AK east to Newf., south to nw. CA, n. ID, MT, AR, and NC.



j. *Hypericum formosum* k. *H. anagalloides* l. *H. majus* m. *Agastache urticifolia* n. *Dracocephalum parviflorum*
 o. *Galeopsis tetrahit* p. *Glechoma hederacea* q. *Lamium amplexicaule*

Marrubium L. HorehoundMarrubium vulgare L.

Horehound

Several stems, up to 1 m long, mostly prostrate, and ascending at the tips, arise from a stout taproot. All herbage, especially the undersides of leaves, is white-woolly. Leaves are petiolate and broadly elliptical to nearly round. Small, white or purplish flowers are arranged in dense whorls in upper leaf axils. Calyx tubes are less than 6 mm long, with 10 recurved and hooked teeth that become burs at maturity.

Horehound is a bitter-tasting and heavily aromatic weed of Eurasian origin. It is used as an herb in treating certain diseases and as an additive to beer and wines. It is known from waste areas in the vicinity of Missoula and Victor. Widespread worldwide.

Mentha L. Mint

All members are distinctly aromatic perennial herbs from creeping rhizomes. Leaves serrate and borne on the main stem. Flowers are arranged in whorls.

1. Whorls of flowers crowded into terminal, spikelike inflorescences and subtended by inconspicuous bracts.....(2) Mentha piperita
1. Whorls of flowers not terminal but set in leaf axils, separated by normal internode distances and subtended by ordinary leaves.....(1) M. arvensis

1. Mentha arvensis L.

Wild Mint, Field Mint

Wild mint is a simple or sparsely branched perennial, to 50 cm (20 in) tall, with short to long, spreading hairs. Leaves have short petioles, sparse marginal teeth and lance-shaped to elliptical blades that taper to the apex. Lavender flowers are arranged in whorls in leaf axils of the middle and upper stem.

Wild mint is a common native plant of wet soils of our valleys, most dense along rivers, sloughs and irrigation ditches. It generally occurs no more than 2 miles upstream beyond canyon mouths. This is a circumboreal species, in U.S. extending south as far as CA, NM, MO, and VA.

2. Mentha piperita L.

Peppermint

Peppermint is a smooth to glandular perennial, 30-100 cm (12-40 in) tall, leaf undersides that are hairy along main veins. Pink to white flowers are densely clustered in whorls at the end of stems.

This vigorous European species is an escapee from cultivation. It is found on stream and ditch banks, bottom lands, and moist roadsides. It can be confused with 2 other mints, M. rotundifolia and M. spicata, that could occur in the vicinity of abandoned homesteads. Now established throughout North America.

Monarda L. Wild Bergamot, Horsemint, MonardaMonarda fistulosa L.

Wild Bergamot, Horsemint, Beebalm

Wild bergamot has many, unbranched, erect stems, to 70 cm (28 in) tall, arising from shallow spreading rhizomes. Leaves are sharp-tipped, elliptical, shallowly toothed, profusely glandular and confined to the main stem. Lavender or rose-purple flowers are aggregated in dense terminal heads. Sepals are fused into a ribbed tube, the top of which has 5 short, spiny lobes covered with dense, white hairs.

This handsome native is strongly aromatic, attracting bees and butterflies of many kinds. It is common on open, dry to moist foothill slopes, in open ponderosa pine stands, and on rockslides and forest openings, always at lower elevations. From Que. south to GA and west to the Rocky Mountain region.

Nepeta L. CatnipNepeta cataria L.

Catnip

Catnip is a taprooted perennial with several, branched, and erect stems, up to 1 m (40 in) tall. Its foliage is so thoroughly densely hairy as to be like felt. All leaves are confined to the stem and are petiolate with triangular to egg-shaped blades that are coarsely toothed. The densely whorled, small, bluish- or yellowish-white flowers are less than 6 mm long and set in terminal, spikelike inflorescences. The upper corolla lip is 2-lobed, while the lower is broad with small, rounded teeth.

Scattered populations occur in waste places in our valleys. This Eurasian species was introduced long ago and is now widespread across North America.



r. *Lamium purpureum* s. *Leonurus cardiaca* t. *Lycopus americanus* u. *L. asper* v. *L. uniflorus*
w. *Marrubium vulgare*

Physostegia Benth. DragonheadPhysostegia parviflora Nutt.

Purple Dragonhead

Purple dragonhead is a perennial, 20-60 cm (8-24 in) tall, with sturdy stems arising singly from a rhizome. All leaves are confined to the stem and are sessile and linearly oblong to oblong-elliptical. The lower ones wither early, and the upper ones gradually decrease in size toward stem tips. Showy pink or purple flowers, 10-12 mm long, are arranged singly in the axils of small bracts in a terminal, spikelike inflorescence. Occasionally the stem forks just below the inflorescence giving it a 2-forked appearance. Flower shape is superficially like that of Penstemon.

This species occurs infrequently in moist, low areas and wet meadows along the Bitterroot and Clark Fork rivers. A very similar, closely related species with larger flowers, P. virginiana, "obedient plant", is often planted in gardens. Mostly east of the Cascade Range.

Prunella L. Self-heal, Heal-allPrunella vulgaris L.

Self-heal, Heal-all

This plant has 1-several decumbent to prostrate stems from a fibrous rooted, short rhizome or caudex. The few leaves are petiolate, entire or obscurely toothed, and lance- to broadly egg-shaped. They are distributed at the base and along the stem or sometimes only on the stem. Blue-violet flowers are whorled in a dense, bracteate, terminal, headlike cluster.

Self-heal is a cosmopolitan plant of mesic habitats. It has a broad amplitude, from lawns and roadsides, where it is a weed, to lush meadows and pastures and open to moderately dense woodlands. Population levels are highest where disturbance is common, as in cattle pastures. It's found along Bitterroot pack trails as high as the mid-subalpine zone.

Salvia L. SageSalvia sclarea L.

Clary, Clear-eye

Clary is a coarse biennial, 0.5-1.5 m (20-60 in) tall, with spreading hairs, many of which (especially in inflorescence) are gland-tipped. Lowermost leaves have long petioles that wither and fall early. The upper leaves are progressively reduced and shorter-petioled toward the stem tip. Whorled, blue flowers are distributed on the upper branches, and the inflorescence is subtended by conspicuous, sessile, acuminate and red-tinged bracts 1-3 cm long.

The plant has been collected only near the road along lower Fred Burr Creek, on the Bitterroot Valley's west side. It is a Mediterranean native found in the U.S. in disturbed areas.

Satureja L. SavorySatureja douglasii (Benth.) Briq.

Yerba Buena, Savory

The woody rhizome of yerba buena gives rise to prostrate, nodally rooting stems, up to 1 m (40 in) long, that bear short, ascending branches. Leaves are blunt-toothed, nearly sessile, and mostly egg-shaped to rotund. Small, white or purplish flowers are borne singly in the leaf axils.

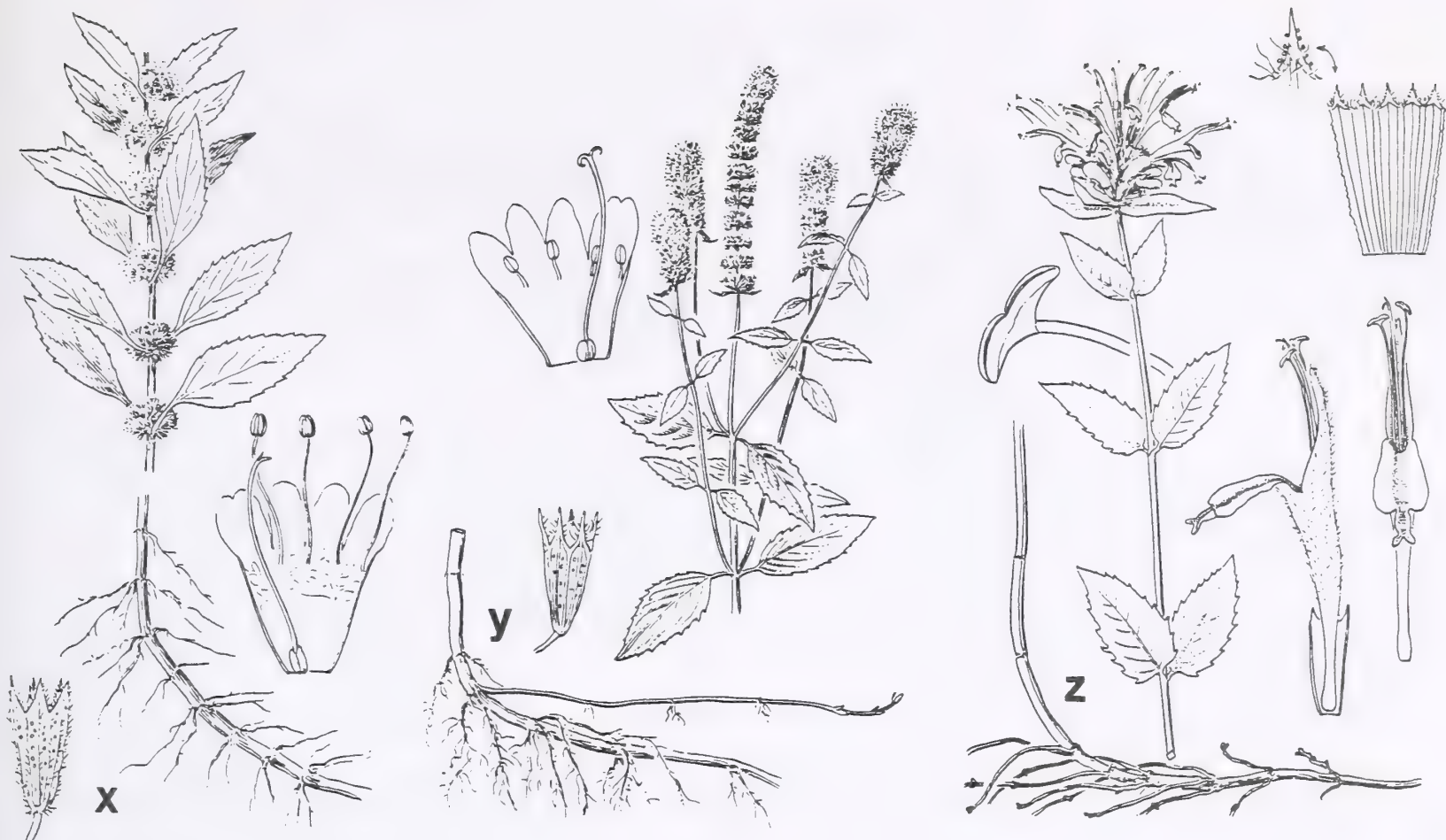
Yerba buena has been collected on disturbed soil near Trapper Creek Trail in the Bitterroot Mountains. Normally this plant is found in coniferous forests from w. B.C. south to CA and as far east as n. ID. Our populations are the eastern outliers of the species.

Scutellaria L. SkullcapScutellaria galericulata L.

Skullcap

Skullcap is a rhizomatous perennial with single or branched stems to 50 cm (20 in) tall. The blunt-toothed, lance- to narrowly egg-shaped leaves, 3-5 cm (1-2 in) long, have very short petioles. Flowers, clear blue with white pencilled lines, are 1.5-2 cm long and solitary in the leaf axils.

Skullcap is known in our area from several locations on low, wet and gravelly banks of the Bitterroot and Clark Fork rivers. These environments are consistent with its general affinity for wet sites, mostly wet meadows. Circumboreal, extending in North America as far south as CA and AZ,



x. *Mentha arvensis* y. *M. piperita* z. *Monarda fistulosa* a. *Nepeta cataria* b. *Physostegia parviflora*

Stachys L. Hedge nettle, WoundwortStachys palustris L.

Hedge Nettle

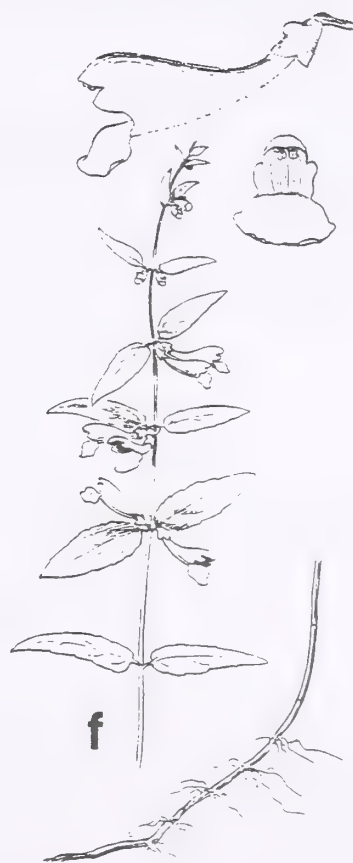
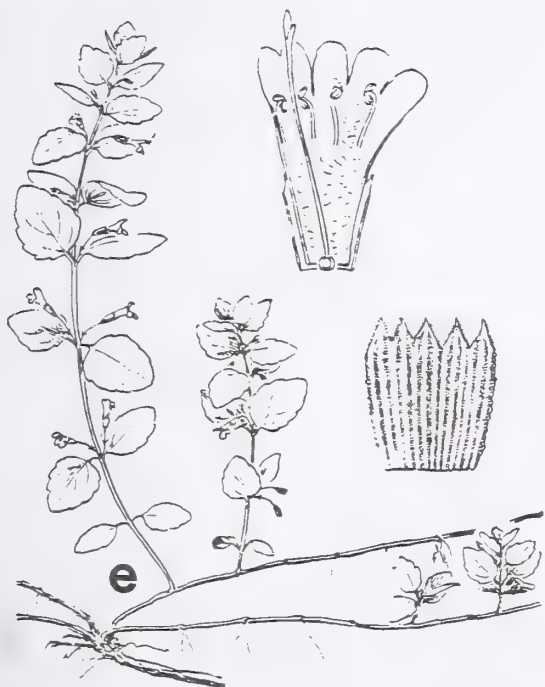
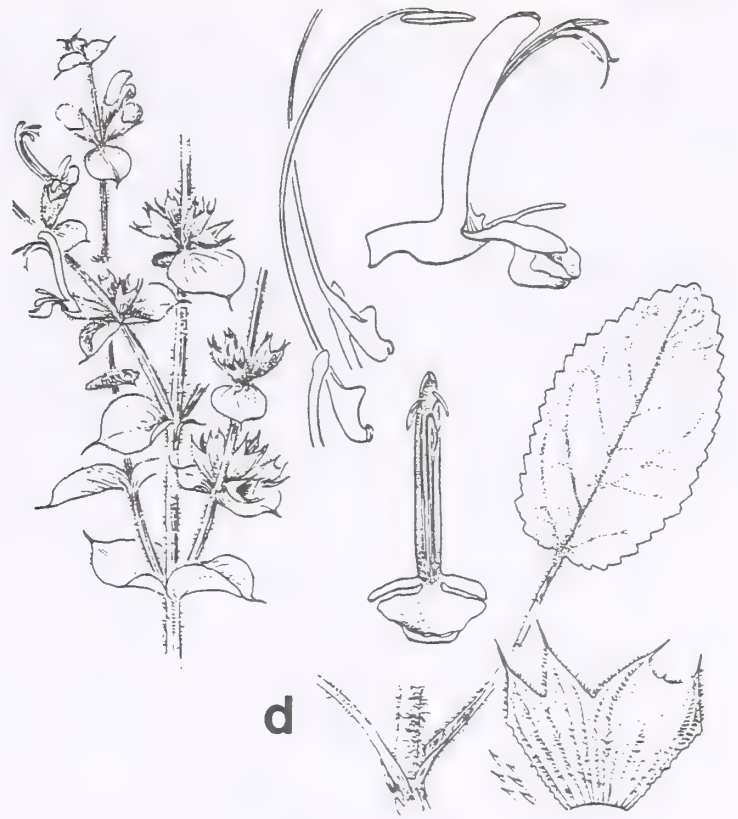
Hedge nettle is a rhizomatous, conspicuously hairy, often glandular perennial, 20-70 cm (8-28 in) tall, with stems that have long, downward-pointing hairs on the angles. Leaves are nearly sessile, triangular lance-shaped to elliptical, and 3.5-9 cm (1-4 in) long. The inflorescence consists of white-dotted, reddish-purple flowers in several whorls; the lower ones are axillary to the leaves, while the upper ones are subtended by progressively reduced bracts.

Hedge nettle, a circumboreal species, is most common on floodplain wet sites of our lower river valleys where it competes successfully with graminoids. Our plants belong to the variety pilosa (Nutt.) Fern. In North America from AK, to OR, NV, AZ and NM, east to New England.

LEGUMINOSAE (FABACEAE) Pea Family

Our members of the pea family include mostly perennial herbs and shrubs, only rarely trees or annuals. They have mostly alternate or basal and compound leaves subtended by stipules. Leaflets are usually entire, have an obvious midvein extending to tip and sometimes bear tendrils (slender, coiled outgrowth of stem or foliage used as support organ). Flowers, bisexual and bilaterally symmetrical, are arranged in elongated, headlike or unbranched clusters. Sepals are 5, green and fused at the base but with free tips. Most corollas consist of 5 petals, the largest upper one termed the "banner", the 2 lateral ones are the "wings" and the 2 lowermost petals are fused at their lower margins to form a boatlike structure, the "keel", which covers the stamens and style. The fruit is a 1- to many-seeded pod (legume) that opens along the 2 fusion lines of the ovary wall.

1. Leaves with grasping, simple to branched tendrils at the tip.....2
1. Leaves lacking tendrils.....3
2. Flowers pale yellow; style long-hairy only at the tip; leaflets often >1.5 cm broad.....Lathyrus
2. Flowers purple-blue; style long-hairy along whole upper side; leaflets mostly <1 cm broad.....Vicia
3. 3 palmately attached leaflets per leaf.....4
3. 4 or more pinnately attached leaflets per leaf.....7
4. Densely tufted, cushionlike plants, leaves with silvery-white hairs.....Astragalus
4. Creeping or erect plants, not tufted, cushionlike; lacking silver-white pubescence.....5
5. Petiole of terminal leaflet absent or not larger than those of other leaflets; flowers in dense spherical, thimblelike, or short, rounded clusters.....Trifolium
5. Petiole of terminal leaflet longer than that of other leaflets; flowers in rounded clusters or narrow, long clusters.....6
6. Pods curved or coiled; inflorescence not over 5 cm long; petals yellowish or blue-purple.....Medicago
6. Pods straight; inflorescence is a loose raceme >5 cm long; petals white or yellow.....Melilotus
7. Plants are trees or shrubs with spines or prickles, at least at bud base.....8
7. Plants herbaceous, rarely shrubby and then without spines or prickles.....9
8. Leaflets number mostly 5-13; shrubs.....Caragana
8. Leaflets number mostly 11-21; trees.....Robinia
9. Flowers all arising from one point, stalkless and crowded in a convex head.....Coronilla
9. Flowers mostly in racemes, which are spikelike, sometimes solitary or paired when plants lack stem leaves.....10
10. Plants with stem leaves; under magnification leaves obviously dotted with glands; petals white or yellowish; pod with hooked prickles.....Glycyrrhiza
10. Plants lacking the above features.....11
11. Keel petal narrowed at tip to a slender beak; plants lacking stem leaves or having pods reflexed toward base of stem.....Oxytropis
11. Keel petal not beaked; plants may or may not have stem leaves; pods variously oriented.....12
12. Plants with 1-seeded pods; petals pink to lavender with reddish-purple lines; wings < 1/2 as long as keel; calyx lobes awl-(needle) shaped.....Onobrychis
12. Plants not like above.....13



c. *Prunella vulgaris* d. *Salvia sclarea* e. *Satureja douglasii* f. *Scutellaria galericulata*
g. *Stachys palustris*

LEGUMINOSAE

13. Keel usually longer than or equalling banner and wing petals; pod conspicuously constricted between the seeds.....Hedysarum
13. Keel shorter than both banner and wings; pod not constricted between seeds.....Astragalus

Astragalus L. Milkvetch, Locoweed

Our species of milkvetch are perennial herbs mostly with leaves that are pinnately divided into several or numerous leaflets. There are small, membranous or leafy appendages at the juncture of the leaf with the stem (stipules). The foliage is glabrous or covered with simple hairs that are attached at the base (basifixed) or near the middle (dolabriform) and thus appearing 2-branched. The few or numerous, pealike flowers are borne on short stalks of narrow inflorescences that arise from the axils of the upper leaves. The upper petal (banner) is usually the longest, and the united lower petals (keel) are rounded or broadly pointed. There are 10 stamens. Pods are variously shaped and textured and are often at least partially divided into two seed chambers.

Although there are approximately 50 species of Astragalus in Montana, only 11 occur in our area, and only 1 is common and widespread. Many of the species will extract selenium from the soil and concentrate this poisonous element in their foliage, thus the common name, locoweed. Since seleniferous soils are rare or absent in our area, it is unlikely that any of these species are poisonous here.

1. Leaflets spine-tipped and ca. 1 mm wide; plants low and mat-forming.....(10) A. kentrophyta
1. Leaflets >1 mm wide and not spine-tipped.....2
2. Flowers mainly white or yellow, sometimes lined or spotted with blue.....3
2. Flowers mainly blue, lavender, or purple.....7
3. Foliage and fruits densely white- to gray-hairy, woolly in appearance.....(3) A. purshii
3. Foliage and fruits nearly glabrous to sparsely, appressed-hairy, not woolly.....4
4. Flowers white with blue penciling, 8-12 mm long.....(1) A. miser
4. Flowers sometimes yellow or cream, >12 mm long.....5
5. Inflorescence short and headlike; flowers tinged with blue or purple.....(8) A. cibarius
5. Inflorescence much longer than wide; flowers not tinged with blue or purple.....6
6. Flowers 12-18 mm long; fruits erect; plants mostly of forest openings.....(2) A. canadensis
6. Flowers 18-25 mm long; fruits pendulous; plants of dry grasslands.....(9) A. drummondii
7. Flowers 6-12 mm long.....8
7. Flowers 13-30 mm long.....10
8. Flowers 6-8 mm long; pods egg-shaped; stems prostrate for much of their length.....(11) A. microcystis
8. Flowers 7-12 mm long; pods more elongated; stems usually erect or nearly so.....9
9. Pods densely black-hairy, 2-lobed in cross section.....(7) A. alpinus
9. Pods glabrous to sparsely hairy, elliptical in cross section.....(1) A. miser
10. Flowers 20-30 mm long; stems prostrate, at least at the base.....(4) A. inflexus
10. Flowers 13-20 mm long; stems often erect or merely curved at the base.....11
11. Stems usually arising singly at the ends of long, rhizomelike rootstocks; pods densely hairy.....(6) A. agrestis
11. Stems clustered on a short-branched rootcrown, pods nearly glabrous to sparsely hairy.....12
12. Stems erect or slightly curved at the base; pod straight and broadly cylindrical.....(5) A. adsurgens
12. At least some of the stems prostrate at the base; pod crescent-shaped.....(8) A. cibarius

1. Astragalus miser Dougl.

Weedy Milkvetch

This variable species has prostrate to erect stems up to 30 cm (12 in) tall from a simple to extensively branched root crown. Foliage is sparsely to densely covered with simple or dolabriform hairs. The leaves are 3-16 cm (1-6 in) long with 9-17 linear to nearly oval leaflets, 5-30 mm long. The 3-10 spreading flowers are borne in each loose inflorescence. The white flowers, 8-12 mm long, have blue lines on the upper petals and purple tipped lower petals. The drooping, flattened-cylindrical pods are glabrous or hairy and 20-30 mm long.

Var. hylophilus (Rydb.) Barneby has simple, basifixed hairs on the foliage, stems mostly less than 15 cm (6 in) tall, and lower petals (keel) 8-10 mm long. It is common in grasslands and open forests in the valleys and montane zones and occurs up to the subalpine zones in the northern 3/4 of our area. Var. serotinus (Gray) Barneby also has basifixed hairs, but the stems are greater than 15 cm (6 in) tall, and

the keel is 6-8 mm long. It is infrequent in the montane and lower subalpine zones in the southeast part of our area. Var. praeteritus Barneby has dolabriform hairs and narrow leaflets. It is locally common in the montane and lower subalpine zones in the southeast part of our area. B.C. to Alta., south to WA, NV, CO, and SD.

2. Astragalus canadensis L.

Canada Milkvetch

Stems up to 80 cm (32 in) tall arise singly or clustered from underground rootstocks, and the foliage is mostly glabrous. Leaves are 10-20 cm (4-8 in) long with 13-29 broadly lance-shaped leaflets. The 30- to 100-flowered inflorescence is congested in flower, becoming more open in fruit. The creamy-white or yellowish, spreading or drooping flowers are 12-18 mm long. The sparsely hairy, erect pods are 8-20 mm long, more or less cylindrical, and 2-lobed in cross section.

Canada milkvetch has been found in open forests in some of the lower Bitterroot Mountain canyons, and it may occur elsewhere in our area. Our plants are var. mortonii (Nutt.) Wats. Much of Can., ne. and w. U.S.

3. Astragalus purshii Dougl.

Woolly-pod Milkvetch

Woolly-pod milkvetch forms mats with prostrate stems up to 10 cm (4 in) long from a branched root crown. Foliage is densely covered with long, light grayish hair. The clustered leaves are 2-15 cm (1-6 in) long with 7-19 elliptical leaflets. The 3-10 flowers are crowded in a headlike inflorescence. They are 10-30 mm long and yellow with a purple spot on the tip of the lower petals. The crescent-shaped pod is 10-25 mm long and densely covered with long, grayish hairs.

Locally common in grasslands around Missoula is the above described var. purshii. B.C. to CA, east to Alta., SD, and NM. In the south-easterly part of the Bitterroot Valley occurs the reddish-purple flowering var. concinus Barneby, c. ID to w.c. MT.

4. Astragalus inflexus Dougl.

Hairy Milkvetch

Hairy milkvetch has several prostrate or ascending stems up to 50 cm (20 in) tall from a branched root crown. Foliage is grayish-hairy. The leaves have 15-29 broadly lance-shaped leaflets 7-18 mm long. The 6- to 19-flowered inflorescence is somewhat congested and headlike. The bright magenta to deep purple flowers are 20-30 mm long and spreading to ascending. The upper petal is reflexed and hairy on the back. The slightly curved pod is 15-30 mm long, densely long, white-hairy, 2-lobed, and much wider than high in cross section.

Occurs scattered in grasslands of the foothills on both sides of the Bitterroot Valley. It is more common in the northern part of our area. WA and OR, east to w. MT.

5. Astragalus adsurgens Hook.

Standing Milkvetch

[A. striatus Nutt.]

Standing milkvetch has clustered stems, 10-30 cm (4-12 in) tall, and foliage that is nearly glabrous to grayish with dolabriform hairs. Leaves are 4-12 cm (2-5 in) long with 9-23 bluntly elliptical leaflets. The 15- to 80-flowered inflorescence is congested and spikelike with the flowers held at an ascending angle. Flowers are bluish-purple and 14-18 mm long with a slightly reflexed upper petal. The thin-coated pods are flattened-cylindrical, 8-12 mm long, and 3-4 mm wide.

This species is infrequent in moist meadows in the Bitterroot Valley. WA to Alta. and MN, south to NM.

6. Astragalus agrestis Dougl.

Purple Milkvetch

[A. dasyglottis Fisch.]

This milkvetch has stems, 10-30 cm (4-12 in) tall, that are usually curved at the base. They arise singly from the ends of long, underground rootstocks that may appear to be rhizomes. The foliage is covered with appressed hairs. Leaves are 4-10 cm (2-4 in) long with 11-19 lance-shaped leaflets. The 7- to 20-flowered inflorescence is congested and headlike at the ends of long, naked stalks. The bluish-purple flowers are 13-19 mm long and held at a nearly erect angle. The black-hairy pod is about 10 mm long, egg-shaped in outline, and heart-shaped in cross-section.

Purple milkvetch is infrequent in moist meadows on both sides of the Bitterroot River. Yuk. to CA, east to Man., MN, IA and KS; Asia.

7. Astragalus alpinus L.

Alpine Milkvetch

Alpine milkvetch has stems, 5-20 cm (2-8 in) tall, with curved or erect bases arising from creeping underground rootstocks. The foliage is sparsely to densely covered with appressed gray hairs. Leaves are 5-15 cm (2-6 in) long with 13-23 elliptical leaflets. The 10-30 flowers are borne at a spreading angle in the open inflorescence. The flowers are 7-12 mm long with light bluish or lavender upper petals and darker lower petals. The drooping, black-hairy pods are 8-12 mm long, sausage-shaped, and heart-shaped in cross section.

This plant is uncommon in meadows and on rocky ridges and slopes in the subalpine zone of the Sapphire Range south to the Continental Divide. Circumpolar, south in w. North America to OR, NV, and NM.



a. *Astragalus miser* b. *A. canadensis* c. *A. purshii* d. *A. inflexus* e. *A. adsurgens* f. *A. agrestis*

8. Astragalus cibarius Sheld.

Browse Milkvetch

Browse milkvetch has clustered stems up to 30 cm (12 in) tall that are prostrate or curved at the base. The foliage is sparsely, appressed hairy and somewhat fleshy. The leaves have 13-19 elliptical leaflets that are 5-15 mm long. The 4- to 15-flowered inflorescence is congested and headlike. The flowers are 15-20 mm long and violet-purple to nearly white with a dark keel. The curved sharp-pointed pods are glabrous or sparsely hairy, 25-35 mm long, and wider than high in cross section.

This milkvetch occurs in grasslands on the hills north of Missoula where it begins to bloom in April. ID to NV and UT, east to MT and CO.

9. Astragalus drummondii Hook.

Drummond's Milkvetch

This milkvetch has several clustered stems up to 80 cm (32 in) tall from a branched root crown. The foliage is grayish-hairy. Leaves have 13-31 narrowly elliptical leaflets 20-35 mm long. The long inflorescence has 20-50 spreading, white or light yellow flowers 18-25 mm long. The upper petal is little reflexed from the lateral petals. The glabrous, bean-shaped fruits hang pendulous and are 20-40 mm long with a heart-shaped cross section.

In our area, Drummond's milkvetch is known only from grasslands on Mount Jumbo north of Missoula. Alta. and Sask., south to UT and NM.

10. Astragalus kentrophyta Gray

Thistle Milkvetch

[A. tegetarius Wats.]

This distinctive milkvetch forms mats of prostrate stems up to 40 cm (16 in) wide and 3 cm (1 in) high. The foliage is covered with appressed, gray hairs. Leaves have 5-9 linear, spine-tipped leaflets, 3-7 mm long and less than 1 mm wide. The purple flowers, 3-10 mm long, are borne in 1- to 3-flowered inflorescences. The egg-shaped pods are 3-5 mm long and sparsely black-hairy.

Thistle milkvetch has been found above timberline in the Bitterroot Mountains on St. Mary's Peak west of Stevensville and on Boulder Peak southwest of Darby. Alta. to ND, south to CA, CO and NE.

Our plants are var. implexus (Canby) Barneby. This is the only legume found in the alpine zone of the Bitterroot Mountains.

11. Astragalus microcystis Gray

Least Bladdery Milkvetch

Least bladdery milkvetch has many prostrate to ascending stems, 10-50 cm (4-20 in) long, from a widely branching root crown. Foliage is nearly glabrous to appressed grayish-hairy. The leaves have 9-15 narrowly elliptical leaflets 5-15 mm long. The have 5-12 spreading flowers that are pink to deep purple and 6-8 mm long. The upper petal is reflexed nearly perpendicular to the lateral petals. The papery, inflated, gray- or black-hairy pods are egg-shaped and 8-12 mm long.

This inconspicuous species has been found in dry, gravelly soil on Mount Jumbo, north of Missoula and Lantern Ridge above Lolo Creek. B.C. and WA, east to MT.

Caragana Raf. Pea TreeCaragana arborescens Raf.

Siberian Pea Tree

Siberian pea tree is a stout shrub with prickles near the base of buds. The 1-4 yellow flowers are borne per leaf axil. The several-seeded pods are round in cross-section.

This shrub is often planted as a hedge in towns but has been noted as scattered escapees, such as those on the Lee Metcalf National Wildlife Refuge near Stevensville. (Not illustrated).

Coronilla L. Crown VetchCoronilla varia L.

Crown Vetch

Crown vetch is a hairless, herbaceous perennial with spreading stems up to 50 cm (20 in) long. Leaves are pinnately divided into 11-15 leaflets that are oblong or elliptical, acute to truncate, and 1-2 cm long. Flowering stems, with 14-20 stalkless flowers emanating from a single point, rise above the leaves. White to pink corollas are 10-12 mm long. Fruits (lomentis) are 4-angled, gently curving and up to 5 cm (2 in) long.

Crown vetch is European, raised here as a garden perennial and roadbank stabilizer. It was collected in the south of our area, along Hays-Moose Creek Road.

Glycyrrhiza L. LicoriceGlycyrrhiza lepidota Pursh

Licorice, Licorice root

Deep, extensive rhizomes give rise to erect, rigid stems, up to 120 cm (48 in) tall, that are covered with stalked or sessile glands. Yellow-brown glands also dot the underside of the 11-19 lance-shaped leaflets, each 1.5 X 4 cm. Pale yellow to greenish-white flowers are crowded along the terminal portion of the long, naked stalk arising from the upper leaf axils. Short, brownish pods are densely set with hooked bristles.

Wild licorice is common along lower creek bottoms and banks of the Bitterroot River and occurs scattered in disturbed areas. From B.C. to Ont. and MN, south to CA, AZ, n. Mex., and TX.

Hedysarum L. Sweetvetch

Sweetvetches are ascending or erect, usually tall, slightly hairy, and sparsely branched perennials. Appendages at the base of the petioles (stipules) are usually brown, large and sheathlike on lower stem and narrow and pointed on upper stem. Flowers are borne in loose clusters well above the leaves. The typical pealike flowers have a keel much longer than wings and banner. Pods are flat, prominently veined, and constricted between seeds. They rupture at these constrictions into several 1-seeded segments.

1. Flowers pale yellow to whitish.....(2) H. sulphurescens
1. Flowers purple to red.....(1) H. occidentale

1. Hedysarum occidentale Greene

Western Sweetvetch

Western sweetvetch is an upright, showy perennial with several stems, up to 80 cm (32 in) tall, from a taprooted, woody crown. The 9-21, egg-shaped leaflets are 1-3 cm long and upper surfaces have minute, brown translucent glands. The 20-80 pendent flowers are bright purplish-red.

A common plant of the subalpine zone, from open forests to rocky ledges; found over the northern half of the Bitterroot Mountains and also in the Sapphire Range. From ID and MT, south to WY and CO, also in the WA Cascades and the Olympic ranges.

2. Hedysarum sulphurescens Rydb.

Sulphur Hedysarum

Sulphur hedysarum bears several, erect, branched stems, 30-60 cm (12-24 in) tall, from a sturdy root crown. Leaves are as in H. occidentale except without glands. The 20-100 flowers are pale yellow to whitish. The pods have prominent network venation and a narrowly (mostly less than 1 mm) winged margin.

This species is common in open forest to meadows of subalpine and timberline habitats of the Anaconda-Pintler Wilderness. East slope of Cascade Mountains from B.C. east to Alta., MT, and WY.

Lathyrus L. Peavine, Sweet Pea

Sweet peas are vines, climbing or supporting themselves on other vegetation from tendrils at the ends of their leaves.

1. Leaflets numbering 2-4; corolla white or cream-colored.....(2) L. ochroleucus
1. Leaflets numbering 4-8; corolla red or purplish, rarely white.....(1) L. latifolius

1. Lathyrus latifolius L.

Everlasting Peavine

This hairless, rhizomatous perennial, 80-200 cm (32-80 in) tall, has broadly winged and climbing stems. Leaflets, mostly 2, are lance-shaped and up to 14 cm (6 in) long with well developed tendrils. Flowers are pink to red. Pods are 6-10 cm (2.5-4 in) long.

This native of Europe tends to escape from cultivation; persistent roadside populations exist near Hamilton. Established along railroads and highways across U.S.

2. Lathyrus ochroleucus Hook.

Cream-flowered Peavine

Cream-colored peavine is 30-80 cm (12-32 in) tall, hairless, and rhizomatous with angled, not winged stems. Leaflets, mostly 6 (4-8) in number, are egg- to lance-shaped or elliptical and 3-7 cm (1.5-7.5 in) long with well developed and branching tendrils. The 6-14 flowers are usually cream-colored (to greenish-white). Pods are 4-7 cm long and 4-7 mm broad.

This species approaches being rare in our area, found only in moist, open woodlands of the Sapphire Range and lush meadows east of the Bitterroot River. Found across Can., south to ne. WA, ID, MT, and the central states.



n. *Hedysarum occidentale* o. *H. sulphurescens* p. *Lathyrus latifolius* q. *L. ochroleucus* r. *Lupinus argenteus*

Lupinus L. Lupine

Lupines are showy perennial or annual plants, in our area reaching maximum development by late spring or early summer and then fading. Leaves are palmately divided into 5 or more leaflets. Flowers, blue, purple, rarely white to cream, or rose, are borne in elongate narrow inflorescences. Pods are flattened and hairy. When profusely blooming, whole hillsides may appear blue or, where balsamroot is also blooming, blue and yellow. On the open slopes above river valleys and in the adjacent ponderosa pine stands, usually only a single lupine species is dominant, but up to 3 species may sometimes co-occur (e.g. on Mount Jumbo, Mount Sentinel and Waterworks Hill, north of Missoula).

1. Plants annual; pods with 2 seeds.....(9) L. pusillus
1. Plants not annual; pods with >2 seeds.....2
2. Leaves nearly all basal, their height surpassing that of flowers.....(8) L. lepidus
2. Leafing mostly from stem, their height surpassed by that of flowers.....3
3. Calyx with a spur (hollow, saclike tubular extension) or enlarged on one side.....(3) L. laxiflorus
3. Calyx lacking a spur and not strongly swollen on one side.....4
4. Back surface of banner prominently hairy.....5
4. Most of back surface of banner lacking or with inconspicuous hairs.....6
5. Flowers in loose racemes; flower stalks often >4 mm long.....(2) L. sericeus
5. Flowers densely clustered in spikelike racemes; flower stalks 0.2-4 mm long.....(7) L. leucophyllus
6. Banner only slightly reflexed from wings to form a narrow V opening of <45 degrees.....7
6. Banner greatly reflexed from wings to form a wide V opening of 60 degrees or more.....8
7. Basal leaves generally present when flowers are open and their petioles 3-5 times as long as leaflets.....(4) L. sulphureus
7. Basal leaves usually not present at time of flowering, their petioles <3 times as long as petioles.....(1) L. argenteus
8. Leaflets lacking hairs on upper surface.....(5) L. polyphyllus
8. Leaflets definitely hairy (short, soft hairs) on upper surface.....(6) L. wyethii

Group I. These are similar plants that are separated only with difficulty in the field. Magnification of the flowers and hairiness of leaves and stems is necessary for positive identification. Several of our most common and broadly distributed species are included here.

1. Lupinus argenteus Pursh

Silvery Lupine

Silvery lupine is 15-40 cm (6-16 in) tall with simple to freely branched, densely long-hairy, often grayish stems. Nearly all leaves are on the stem, with petioles just shorter than to about twice as long as the blade. The 6-9 leaflets are narrowly lance-shaped to broadly inversely lance-shaped, mostly 2-3 cm long, with soft, long and appressed hairs giving a silky texture. Flowers are from white to deep blue but always with a hairless banner.

Var. argenteus has greenish foliage, while var. depressus (Rydb.) Hitchc. has silvery foliage. Both varieties occur intermittently from Blue Mountain, west of Missoula, to along the eastern front of the Bitterroot Mountains to the Nez Perce Pass vicinity. Habitats include ponderosa pine forests to subalpine ridges. From OR northeast to Alta., MT, and SD.

2. Lupinus sericeus Pursh

Blue-bonnet Lupine, Silky Lupine

Silky lupine is very similar to L. argenteus, apparently intergrading with it, but tending on average to have more and longer leaflets. Most common flower color is dark blue. The banner is usually densely hairy on the back.

Silky lupine is found from moist to dry grasslands to open upper subalpine sites. It has been collected on all the foothills around Missoula, along the east front of the Bitterroot Mountains south to the Upper West Fork and the Continental Divide. Wholly east of the Cascades from B.C. to CA, AZ, east to the Rocky Mountains from Alta. to NM.

3. Lupinus laxiflorus Dougl.

Spurred Lupine

[L. arbustus Dougl.]

Spurred lupine is a perennial with numerous erect to spreading, simple to sparingly branched stems 30-50 cm (12-20 in) tall. The 7-11 leaflets are inversely lance-shaped with acute to abruptly pointed or even rounded tips. Flower colors is variable. The calyx has a conspicuous spur or sac, and the banner is not greatly reflexed and mostly copiously hairy on the back to above the center.



g. *Astragalus alpinus* h. *A. cibarius* i. *A. drummondii* j. *A. kentrophyta* k. *A. microcystis*
 l. *Coronilla varia* m. *Glycyrrhiza lepidota*

LEGUMINOSAE

Our variety, pseudoparviflorus (Rydb.) Smith & St. John is common in lower elevation, open ponderosa pine and Douglas-fir stands. Populations are known from the Lower Rattlesnake, Mount Jumbo, Miller Creek and southward along the Sapphire Range. Larger populations are known on the lower slopes of the Bitterroot Mountains. East of the Cascades from WA to CA, east to ID, MT, UT, and NV.

4. Lupinus sulphureus Dougl.

Sulfur Lupine

Sulfur lupine is distinguished from the above species by having basal leaves at flowering time and leaf petioles 3-5 times longer than the leaflets. Backs of the banners are hairless to inconspicuously hairy. Flowers are blue or purple in our area.

Sulfur lupine is rare in our area, having been collected only twice, at the head of Rye Creek southeast of Darby and north of Lolo Hot Springs. Our plants are var. subsaccatus (Suksd.) Hitchc. Our populations are disjunct from the main range of the species. East base of the Cascades to central OR. and east end of the Columbia River Gorge.

Group II. Here are species that can be easily distinguished one from another in the field.

5. Lupinus polyphyllus Lindl.

Bigleaf Lupine, Washington Lupine

Bigleaf lupine is a stately plant with unbranched stems 0.5-1.5 m, (20-60 in) tall. Petiole length of stem leaves is sharply reduced upward, from 3-6 times the blade length to shorter than the blade. The 9-13 leaflets are elliptical to inversely lance-shaped, 4-10(15) cm (1.6-4 in) long, and smooth on the upper surfaces, the lower ones with short, stiff and appressed hairs. The inflorescence is long (15-40 cm), tapering to a point and composed of bluish to violet flowers with smooth banners.

Even though the forms from east of the Cascades (var. polyphyllus) are somewhat dwarfed compared to the western forms, bigleaf lupine is still our most lush and robust native species. It is the species from which the garden forms were derived. Requiring more moisture than other lupines, it is typical of hay meadows and other wet open habitats. It occurs from the meadows south of Missoula and Buckhouse Bridge to the upper ends of Lolo Creek and Bitterroot River Valleys, grading with rising elevation to the subalpine variety, burkei (Wats.) C.L. Hitchc. Shorter, smaller and entirely smooth, it occurs in moist montane and subalpine meadows throughout our mountain ranges. In the high subalpine meadows of the Selway-Bitterroot Divide, some color variations occur, from the usual blue-purple to pink and even white.

6. Lupinus wyethii Wats.

Wyeth's Lupine

Like L. polyphyllus, Wyeth's lupine has a robust, unbranched stem, 40-60 cm (16-24 in) tall, but differs by having leaves that are short-hairy on both surfaces and stems that are not hollow.

This native is the first lupine to flower and is most common on the open, grassy slopes around Missoula, south to the northern foothills of the Bitterroot Mountains between Lolo and Florence; also scattered near Burnt Fork of the Bitterroot River east of Stevensville and Victor. It may occur as high as subalpine forests. From B.C. to CA, east to Alta. and south to CO, but most abundant in MT and ID.

7. Lupinus leucophyllus Dougl.

Velvet Lupine

With simple to branched stems from 30-70 cm (12-30 in) tall, velvet lupine differs from our other species by the very dense pubescence (tomentum) of the stems and both leaf surfaces. Plants appear whitish to light gray and like velvet to the touch. Flowers are small (8-10 mm long), narrow, and densely set in indistinct whorls to form a long, tapered inflorescence. The banners are only slightly reflexed and thickly hairy over much of the back.

Scattered populations occur near the old Stevensville railroad station and along St. Mary's Road. It is also known from Lost Horse Creek south toward Lake Como and again south of Darby. All locations are in the foothills and open woodland of the Bitterroot Mountains. From c. WA to ne. CA and from the east slope Cascades foothills to MT, ID, w. NV, and nw. WY.

8. Lupinus lepidus Dougl.

Prairie Lupine, Pacific Lupine

Prairie lupine is a dwarf, spreading to mat-forming, silver-hairy perennial, up to 20 cm (8 in) tall, with short flowering stems. Leaves are mostly basal, copiously hairy on both surfaces and have petioles 2 to 5 times longer than blades. Flowers are deep blue with a hairless and sharply reflexed banner.

Our variety, utahensis (Wats.) C.L. Hitchc., has inflorescences so short as to be surpassed and almost concealed at flowering time. It has been collected but once, on Lantern Ridge in the Bitterroot Mountains. Usually found in moist habitats on both sides of the Cascades from B.C. south to CA and east to MT, WY, and CO.

9. Lupinus pusillus Pursh

Rusty Lupine

Rusty lupine is our only annual species. It is dwarfed, 5-20 cm (2-8 in) tall, long- and soft-hairy, and more delicate appearing than other lupines. Flowering stalks are short with the tops of



s. *Lupinus sericeus* t. *L. laxiflorus* u. *L. sulphureus* v. *L. polyphyllus*

LEGUMINOSAE

inflorescences slightly exceeding to considerably shorter than leaf heights. Light blue to deep bluish-purple flowers are crowded but not whorled in the inflorescence.

Though generally found in sandy desert soil, in our area it is found on roadcuts and other disturbed ground. It has been collected along the Elk Meadows Road. From c. WA south to CA and AZ, east to Alta., MT, ND, and NE.

Medicago L. Alfalfa, Medic

This genus includes hairless, branching perennial and annual plants with several erect to decumbent stems. Leaves are divided into 3 leaflets, the terminal segment evidently longer-stalked than the other 2. Flowers typical of legumes. Pods are twisted.

1. Plants somewhat shallow-rooted annuals; flowers <6 mm long.....(1) M. lupulina
1. Plants deep-rooted perennials; flowers 6-10 mm long.....(2) M. sativa

1. Medicago lupulina L.

Black Medic, Hop Clover

Black medic has profusely branched, creeping or decumbent stems up to 50 cm (20 in) long. There are small, pointed appendages (stipules) attached to petiole bases. Leaflets are mostly elliptical to inversely egg-shaped and 5-20 mm long. The terminal one is wedge-shaped, toothed on the distal end. Yellow flowers are borne in congested, rounded heads less than 1 cm long. Mature pods are black and prominently veined with a slight spiral twist.

This European introduction is a noxious lawn and garden weed and is also locally established in waste places. Established throughout U.S.

2. Medicago sativa L.

Alfalfa, Lucerne

Alfalfa is a more or less erect multiply-branched perennial 30-100 cm (40 in) tall. Leaflets, mostly 2-4 cm long, are inversely lance- to wedge-shaped and narrowly tapered to the base and have a rounded to blunt and toothed tip. Stipules are entire, long-tapered to the apex, and attached to petiole. Mature pods are brown, 1-3 times coiled, and have prominent net-patterned venation.

Alfalfa is commonly planted for hay and has escaped along roads and in pastures.

Melilotus Mill. Sweet Clover, Melilot

This genus includes strongly taprooted, hairless, copiously branching and leafy annual and biennial plants with stems to 2 m (80 in) tall. Leaves, with slender appendages (stipules) attached at the base of the petiole, are divided into 3 fine-toothed elliptical to wedge-shaped leaflets. Flowers, often nodding on fine individual stalks, are loosely arranged in an inflorescence up to 15 cm (6 in) long. Pods are thickly spindle-shaped, about 3 mm long, with a net-veined surface.

1. Corolla white; pods net-veined.....(1) M. alba
1. Corolla yellow; pods mostly obscurely cross-corrugated.....(2) M. officinalis

1. Melilotus alba Desr.

White Sweet Clover

Characteristics of white sweet clover are those of the genus description and key.

This Eurasian native is widely distributed as a weed over most of the U.S. and Can.

2. Melilotus officinalis (L.) Lam.

Yellow Sweet Clover

Physical characteristics of yellow sweet clover are those of the genus description and key.

This Mediterranean native is an abundant weed of roadsides and wasteland, sometimes useful as pioneer plants on recently disturbed sites.

Onobrychis Adans. Sainfoin

Onobrychis viciaefolia Scop.

Sainfoin, Holy-clover

Sainfoin is a tufted perennial, 20-40 cm (8-16 in) tall, with lance-shaped, reddish-brown stipules. Leaves are pinnately divided into 11-17 elliptical to inversely lance-shaped leaflets, 1-2 cm long, that end in an abrupt slender tip. Corollas are pink to lavender or rose-red prominently lined with reddish-purple. Inversely egg-shaped, 1-seeded fruits are strongly hairy with a wrinkled, knobby surface.

This European native has been introduced as stock feed; a small population has become established near the lower Skalkaho Road southeast of Hamilton.



w. *Lupinus wyethii* x. *L. leucophyllus* y. *L. lepidus* z. *L. pusillus* a. *Medicago lupulina* b. *M. sativa*

Oxytropis D.C. Crazyweed, Locoweed, Stemless Loco

Locoweeds are tufted, hairy perennials lacking leafy flowering stems (except O. deflexa). Leaves and stems arise crowded from strong root crowns and taproots. Leaflets of pinnately divided leaves occasionally have asymmetrical bases. Simple, pointed leaflike appendages (stipules) are fused with petiole bases. Flowers are typically leguminous; the banner is obliquely erect and the keel is prominently beaked. Pods, inflated to membranous or leathery, are stalkless or with short stalks. Oxytropis is similar to Astragalus but differs significantly by having a beaked keel and virtually lacking stem leaves.

Not a single Oxytropis spp. is common in our area, and none occur in the Bitterroot Mountains. Some of the species are poisonous to livestock, a condition recognized in the common name.

1. Stipules free or united with petiole for 1-4 mm, the free portion usually longer; pods pendulous.....(2) O. deflexa
1. Stipules united with petiole for at least 4 mm or for > 1/2 their length; pods are erect to spreading.....2
2. Plants glandular, especially on calyx lobes.....(4) O. viscida
2. Plants not glandular.....3
3. Corolla white, yellow, or cream (ochroleucus).....(3) O. sericea
3. Corolla colors not as above, mostly blue, purple, pinkish or reddish.....(1) O. besseyi

1. Oxytropis besseyi (Rydb.) Blank.

Bessey's Crazyweed

This tufted perennial is silvery-gray with appressed hairs throughout. Leaves are 2-11 cm long with 7-21 leaflets. Stipules are united to the petiole for over 1/2 their length. Flowers are a bright magenta-purple.

Our variety, besseyi, occurs on the east side of the Bitterroot River on foothills of the Sapphire Range, with populations known from Three-mile, Birch, Soft Rock, and Skalkaho Creeks. From MT and c. ID to CO.

2. Oxytropis deflexa (Pall.)

Pendent-pod Crazyweed

Pendent-pod crazyweed, a slender, tufted perennial with long, soft and wavy hairs producing a grayish-green cast, has stems so short that usually all leaves are basal (some forms have leafy stems to 30 cm tall). Stipules are leafy and green. Broadly lance-shaped leaflets decrease in size toward the leaf tip. Several flowering stalks, less than 20 cm (8 in), project from the midst of decumbent to prostrate stems. Corollas are up to 7 mm long, white to bluish-purple with the beak of keel short and blunt. Grayish to black pods are round in cross-section and usually nodding.

Our variety, foliosa (Hook.) Barneby, occurs in gravelly, well-drained meadows that may be wet in early spring or flooded for short periods. It also grows on creek or river banks. Widely distributed in Siberia and North America.

3. Oxytropis sericea Nutt.

Silky Crazyweed

Silky crazyweed is an erect, tufted perennial, usually less than 20 cm (8 in) tall, with copious long, silky hairs that give grayish cast to the foliage. The membranous stipules, 10-30 mm long, are united with the petiole for 3/4 of their length. Flowers, 15-27 mm long and mostly bright yellow (to white), are borne in compact, spikelike inflorescences. Pod walls are thick (about 1 mm), either fleshy or bony.

Only 1 population is recorded from our area, the crest of Mount Jumbo. In its overall range normal habitats range from lower elevation prairie to timberline meadows. Both var. sericea with cream to white corollas and var. spicata (Hook.) Barneby with lemon to sulfur yellow corollas are potentially present in our area. From NM to n. Can. on both slopes of the Rocky Mountains.

4. Oxytropis viscida Nutt.

Sticky Crazyweed

This highly variable, tufted, low-growing perennial is hairy and sticky throughout (especially on calyx) due to wartlike glands. Leaves, all clustered at the base, are 3-20 cm (1-8 in) long, with stipules that are 6-12 mm long and fused to the petiole for over 1/2 their length. Light purplish-blue flowers are borne in narrow inflorescences, 2-7 cm (1-3 in) long, on stalks that just exceed the leaves.

This species is found on the west slopes of West Pintler Peak in the Anaconda-Pintler Wilderness, where Ravalli, Granite and Beaverhead Counties meet. From AK to Que. and southward, mostly in the Rocky Mountains to CO and west to the Sierra Nevada of CA and the Olympic Range of WA.



c. *Melilotus alba* d. *M. officinalis* e. *Onobrychis viciaefolia* f. *Oxytropis besseyi* g. *O. deflexa*
h. *Oxytropis sericea* i. *O. viscida*

Robinia L. LocustRobinia pseudo-acacia L.

Black Locust, Yellow Locust, False Acacia

Black locust is a stately tree, to 25 m (80 ft) tall, with stipules modified into large thorns. Leaves, 2-4 cm long, are pinnately divided into 11-21 lance-shaped leaflets. The 30-70 showy, white, and fragrant flowers are borne in narrow inflorescences 10-15 cm (4-6 in) long.

This native of the eastern U.S. has been widely planted in our area, only occasionally escaping to establish near dwellings or along rivers.

Thermopsis R. Br. Buck-bean, Golden-pea, Golden-banner, ThermopsisThermopsis montana Nutt.

Mountain Thermopsis

Mountain thermopsis is a rhizomatous and mostly hollow-stemmed perennial up to 90 cm (36 in) tall. Foliage is glabrous to densely long-hairy. Large leaflike appendages (stipules) are heart-, egg-, or lance-shaped and as wide as leaflets. The 3 leaflets are broadly elliptical to egg-shaped or linear-elliptical and up to 10 cm (4 in) long. The yellow flowers somewhat resemble those of lupines. Pods are straight, long-hairy and erect to ascending in narrow inflorescences.

Several small colonies are known from the north side of Hellgate Canyon, east of Missoula. Occurring in sandy, well-drained soil to wet meadows or open, lower elevation forests. From B.C. to CA, east to the Rocky Mountains, MT to CO.

Trifolium L. Clover, Trefoil

This genus contains annual and perennial, mostly rhizomatous herbs with leaves that are divided into 3 or more leaflets. There are small membranous appendages partly surrounding the stem at the base of the petiole (stipules). Flowers are pea-like with banner, wings and keel. They usually lack stalks and are densely aggregated into globe- or head-shaped clusters, often subtended by a series of bracts united for most of their length and completely encircling the base of the clusters (involucre). Flower colors are white, yellow, pink, red, or purple. Seed pods are globose to elongated. Of the 14 species occurring in our area, seven are introduced. No native alpine species are found in our area.

1. Plants annual (slender taproot or few fibrous roots).....2
1. Plants perennial.....7
2. Flowering heads subtended by involucre (set of bracts).....3
2. Flowering heads not subtended by involucre.....5
3. Involucre bracts with long hairs.....(2) I. microcephalum
3. Involucre bracts hairless (glabrous) or nearly so.....4
4. Calyx teeth (lobes), or some of them, divided into several linear projections.....(1) I. cyathiferum
4. Calyx teeth linear but not divided into segments.....(3) I. variegatum
5. Width of pressed flowering heads mostly 8 mm or less; flowers 3-4 mm long, mostly 3-30...(5) I. dubium
5. Width of pressed heads mostly > 8 mm, flowers 4-7 mm long, 10-70 flowers per head.....6
6. Terminal leaflet stalk 2 times or more times as long as those of lateral leaflets....(6) I. procumbens
6. Terminal leaflet stalk length about equal to those of lateral leaflets.....(4) I. agrarium
7. Plants having prominent, upright and leaf-bearing stems or the stems creeping or decumbent and usually rooting at the nodes, the internodes conspicuous.....8
7. Plants mostly densely tufted (cespitose) with all, or almost all, the leaves basal, the internodes usually obscure; this species with leathery and prominently toothed leaflets.....(13) I. gymnocarpon
8. Flowers subtended by a true involucre or by stipules appearing to be an involucre.....9
8. Flowers not subtended by an involucre of any sort.....10
9. Flowers subtended by false involucre of stipules from one or many leaves.....(7) I. pratense
9. Flowers subtended by a involucre of true bracts (reduced or modified leaves).....(10) I. fragiferum
10. Flowers mostly 11-18 mm long; leaflets mostly elliptical, lance- to inversely lance-shaped, or if broader, the calyx hairy.....11
10. Flowers 5-10 mm long; leaflets mostly egg- to inversely egg-shaped to almost round; calyx smooth or nearly so.....13
11. Calyx teeth (lobes) densely set with long, soft, loose hairs; calyx tube abruptly swollen on one side due to the flowers being reflexed (bent back).....(12) I. eriocephalum
11. Calyx lobes set, at most, with short, soft and loose hairs; calyx tube not bulged.....12

12. Leaflets mostly egg- to inversely egg-shaped and rarely over twice as long as wide; calyx hairy.....(14) I. latifolium
12. Leaflets mostly narrower, mostly over 2 X as long as wide; calyx with or without hairs.....(11) I. longipes
13. Stems creeping and rooting at the nodes; the flowering stems arising from or near ground level; calyx usually without hairs.....(9) I. repens
13. Stems usually not creeping; the flowering stems arising from well above ground level; hairs on calyx especially near base of lobes.....(8) I. hybridum

Group I. Included here are native annuals that are mostly uncommon and seldom weedy.

1. Trifolium cyathiferum Lindl.

Cup Clover

Cup clover is a smooth, erect to ascending annual 10-25 cm (4-10 in) tall. The inflorescence is subtended by a finely toothed, 6- to 14-lobed, cup-shaped or flared bract (involucre). Flowers are white or dull yellow to pink.

This species is found in seepage areas of montane and subalpine meadows of the Bitterroot Mountains and west of Missoula in vernal moist, sandy places. Wholly east of Cascades from B.C. to CA, east to ID and MT.

2. Trifolium microcephalum Pursh

Woolly Clover

Woolly clover is a sparsely to copiously, long-hairy annual with prostrate to erect stems 10-50 cm (4-20 in) long. The involucre is shallowly cup-shaped, sometimes exceeding the lower flowers, with 6-12 shallow, entire lobes that narrow to a long, fine point. Flowers are white to pinkish.

Originally collected in Montana by Lewis and Clark, this species was only recently rediscovered in our area by W. Albert in meadows near Stevensville. Outside our area it is found from drier hillsides to moist meadows and sandy riparian sites. From sw. B.C. south to Baja Cal. east to MT, NV, and AZ.

3. Trifolium variegatum Nutt.

White-tip Clover

The annual white-tip clover has prostrate to erect stems, 10-40 cm (4-16 in) long, with egg-shaped, deeply incised appendages at the base of the petioles (stipules). The involucre is widely flared and saucer-shaped, irregularly lobed and incised about 1/2 its length. Corolla is purplish, often white-tipped, and aging to brown.

White-tip clover has been collected near Missoula and Hamilton. It is typically found on moist meadows to dry, sandy soil. From B.C. to CA, mostly west of the Cascades and Sierra Nevada but occasionally east to MT and UT.

Group II. These are introduced, locally abundant, and weedy annuals with yellow flowers.

4. Trifolium agrarium L.

Hop Clover

Hop clover has several erect to ascending stems 20-40 cm (8-16 in) long. Leaf petioles are usually shorter than the stipules. The axillary, densely-flowered, conical heads are longer than the leaves and lack an involucre. The calyx is glabrous and about 1/2 the length of the yellow corolla.

This European native is widely distributed in the U.S. in dry, waste places such as roadsides. In our area it occurs in Pattee Canyon and other Missoula roadsides and south of Darby.

5. Trifolium dubium Sibth.

Least Hop Clover

The 1-several stems of this sparsely hairy annual are prostrate or decumbent to erect and 10-40 cm (4-16 in) long. Petioles are usually shorter than the leaf blade, whereas the 3-30 flowered, axillary heads are borne on slender stalks considerably longer than the leaves. The glabrous 5-nerved calyx is about 1/2 the length of the yellow corolla.

This weedy European native, common on waste places throughout the U.S., is uncommon in our area, collected se. of Missoula.

6. Trifolium procumbens L.

Low Hop Clover

Low hop clover is much like I. agrarium in habit and structure but has shorter and generally more decumbent to prostrate stems, narrower heads, and egg-shaped stipules that are united to the petiole for about 1/2 their length.

This European species is now widely distributed on waste areas (roadsides, etc.) of the U.S. In our area it occurs along the Lower Skalkaho Road and local railroad rights-of-way.



j. *Robinia pseudo-acacia* k. *Thermopsis montana* l. *Trifolium cyathiferum* m. *T. microcephalum*
 n. *Trifolium variegatum* o. *T. agrarium* p. *T. dubium* q. *T. procumbens*

Group III. Includes perennial clovers originally introduced for agricultural purposes.

7. Trifolium pratense L.

Red Clover

This robust, sparsely soft-hairy, taprooted, and short-lived perennial has multiple erect stems 20-100 cm (8-40 in) tall. The 1-3 cm long white stipules are conspicuously greenish veined. Deep red flowers are borne in a dense head that is sessile or borne on a stalk shorter than the leaf petioles.

A cultivated European native introduced widely across the western U.S. In our area it is common along mountain roads and pack trails mostly in the foothills to lower subalpine zone.

8. Trifolium hybridum L.

Alsike Clover

The multiple, sparsely hairy, clustered, ascending or erect stems, 50 cm (20 in) or more long, arise from a rhizome or runner. The long-tapered stipules are white and membranelike, with green veins fused around the stem. Stalks of the flowering head vary from shorter than the leaves to several times their length. This plant resembles I. repens except that the stipules are longer, vegetative parts are more hairy, the calyx tube has tufts of hair near its top, and the flowers are a deeper pink.

This European native is common on lower elevation waste places but less common in the mountains than either I. pratense or I. repens.

9. Trifolium repens L.

White Clover

A perennial with creeping stems, 10-50 (4-20 in) long, that root at the nodes. Leaves have petioles up to 20 cm (8 in) long with white stipules that are fused for more than half their length. Spherical, 2-2.5 cm diameter heads are borne on stalks to 30 cm (12 in) long. The needle-like calyx lobes are about as long as the tube itself. The corolla is creamy white, occasionally tinged with pink.

Red clover has been widely introduced across the U.S. It is common in our area from the foothills to mid-subalpine zone, wherever stock have been trailed or the substrate has been disturbed.

10. Trifolium fragiferum L.

Strawberry Clover

Strawberry clover has decumbent to creeping, nodally rooting stems 5-30 cm (2-12 in) tall. Flowers are mostly purplish-pink to white and subtended by bracts, the lowest of which are united into an involucre. After flowering, the calyx tube inflates causing the head to resemble a strange big berry.

This European native is widely introduced in the eastern U.S. and Pacific states. It is uncommon in our area, known from Kelly Island downstream from Missoula on the Clark Fork River, and from ne. of Hamilton.

Group IV. This group includes our native perennial species.

11. Trifolium longipes Nutt.

Longstalk Clover

This rhizomatous perennial has a strong taproot and a sparingly branched crown. Foliage is sparsely to profusely hairy and stems are lax or creeping and 5-30 cm (2-12 in) long. The 20- to 100-flowered, terminal heads are somewhat rounded to oval, borne on stalks that considerably exceed the upright, lance-shaped leaves.

Var. longipes has ascending or erect flowers and var. reflexum A. Nels. has lower flowers that bend down toward stem. This is our most common and widespread species of Trifolium. It occurs on moist substrates from the foothills to subalpine meadows and forests, often in open lodgepole pine stands. Widely distributed in western North America from B.C. south to s. CA and east to the s. Rocky Mountains.

12. Trifolium eriocephalum Nutt.

Woolly-head Clover

Woolly-head clover is a long- to short-hairy perennial with 1-several stems, 20-40 cm (8-16 in) tall, arising from a branched crown. Leaflets subtended by entire, lance-shaped stipules are elliptical or lance-shaped to almost linear. The calyx, slightly pouched-out on the upper side, has long, soft, mostly erect hairs.

Our var. piperi Martin, is known from Fales Flat Meadows along the Upper Nez Perce Fork of the Bitterroot River and the meadows of Blue Joint Creek near the Idaho border. It is on the eastern edge of its range in our area. Blue Mountains of OR and WA and adjacent ID and W. MT.

13. Trifolium gymnocarpon Nutt.

Hollyleaf Clover

Foliage of this tufted, strongly taprooted perennial has a grayish cast due to the short, straight, appressed hairs. The 3-15 greenish to yellowish-white flowers are clustered into terminal heads that are shorter than the leaf canopy.

The plant is locally well represented on dry, wooded ridges south of the Painted Rock Reservoir of the West Fork of the Bitterroot River. It occurs in dry soils of sagebrush desert to ponderosa pine forest from ne. OR to CA and n. AZ, east to MT and NM.

14. Trifolium latifolium (Hook.) Greene

Twin Clover

Twin clover is a moderately appressed-hairy, rhizomatous perennial with stems 10-40 cm (4-16 in) tall. At a distance it resembles T. hybridum in growth-form and pink flower heads, but the calyx is conspicuously hairy or at least not hairy just on sinuses of the calyx as in T. hybridum.

It has been collected in the Lolo Creek drainage near Fort Fizzle. This native occurs from Wallowa County, OR to Missoula County, MT.

Vicia L. Vetch

Vetches are annual or perennial herbs with trailing to climbing stems, entire to arrowhead-shaped appendages at the base of the leaf petioles (stipules) and pinnately divided leaves that have a tendril in place of a terminal leaflets. Typical leguminous flowers are borne solitary or in narrow inflorescences. The 10 stamens are mostly arranged in 2 unequal groups, and the slender, round styles are densely bearded just below the stigmatic tip.

1. Mostly 10 or fewer flowers per inflorescence; calyx not pouched-out at base.....2
1. Mostly > 10 flowers per raceme; calyx base abruptly bulged-out.....4
2. Length of flowers about 6 mm or less.....(5) V. tetrasperma
2. Flower length 12 mm or more.....3
3. Flowers, sessile or with very short stalk, 1-3 per axil.....(3) V. sativa
3. Flowers, 4-10 borne on stalk arising in leaf axils.....(1) V. americana
4. Longest calyx teeth about 2 mm; perennial with mostly short, curled or appressed hairs or glabrous.....(2) V. cracca
4. Longest calyx teeth about 4 mm long; annual/biennial with long, spreading hairs.....(4) V. villosa

1. Vicia americana Muhl.

American Vetch

American vetch is a mostly single-stemmed, extremely variable perennial ranging from subglabrous to densely hairy. Plants are from 15-80 cm (6-36 in) tall, with simple to highly branched and grasping tendrils. The 8-16 leaflets are variable in size, texture and shape, but have prominent, parallel veins. Stipules are green, crescent-shaped and deeply cleft or toothed. The 4-8(10) bluish- to reddish-purple pealike flowers are arranged in a loose inflorescence and develop into hairless pods 2.5-3.5 cm long.

This species is only sparingly distributed from the hills surrounding Missoula to the west slopes of the Sapphire Range, both in moist meadows and open to closed forests. From s. AK east to Ont. south to CA, n. Mex. and MO.

2. Vicia cracca L.

Bird Vetch

Bird vetch is a glabrous to finely short-hairy perennial up to 1 m (40 in) tall. The leaves are mostly 6-12 cm (2-5 in) long with 12-18, slender, linear leaflets that abruptly narrow to a pointed tip. The 20-40 violet and pendulous flowers are congested on an inflorescence that is longer than the supporting stalk.

This Eurasian native is widely naturalized in the eastern U.S. but, unlike V. villosa, it is uncommon here.

3. Vicia sativa L.

Common Vetch

Common vetch is a 20-80 cm (8-32 in) tall perennial with deeply toothed to arrowhead-shaped stipules. The flowers, up to 3 borne singly and apparently sessile in the leaf axils, are bicolored with banners light orchid to purple, and the wings are a deeper shade, often red.

Our old records indicate that this European species once occurred in the Bitterroot Valley. It is widely introduced to much of the U.S.

4. Vicia villosa Roth

Hairy Vetch

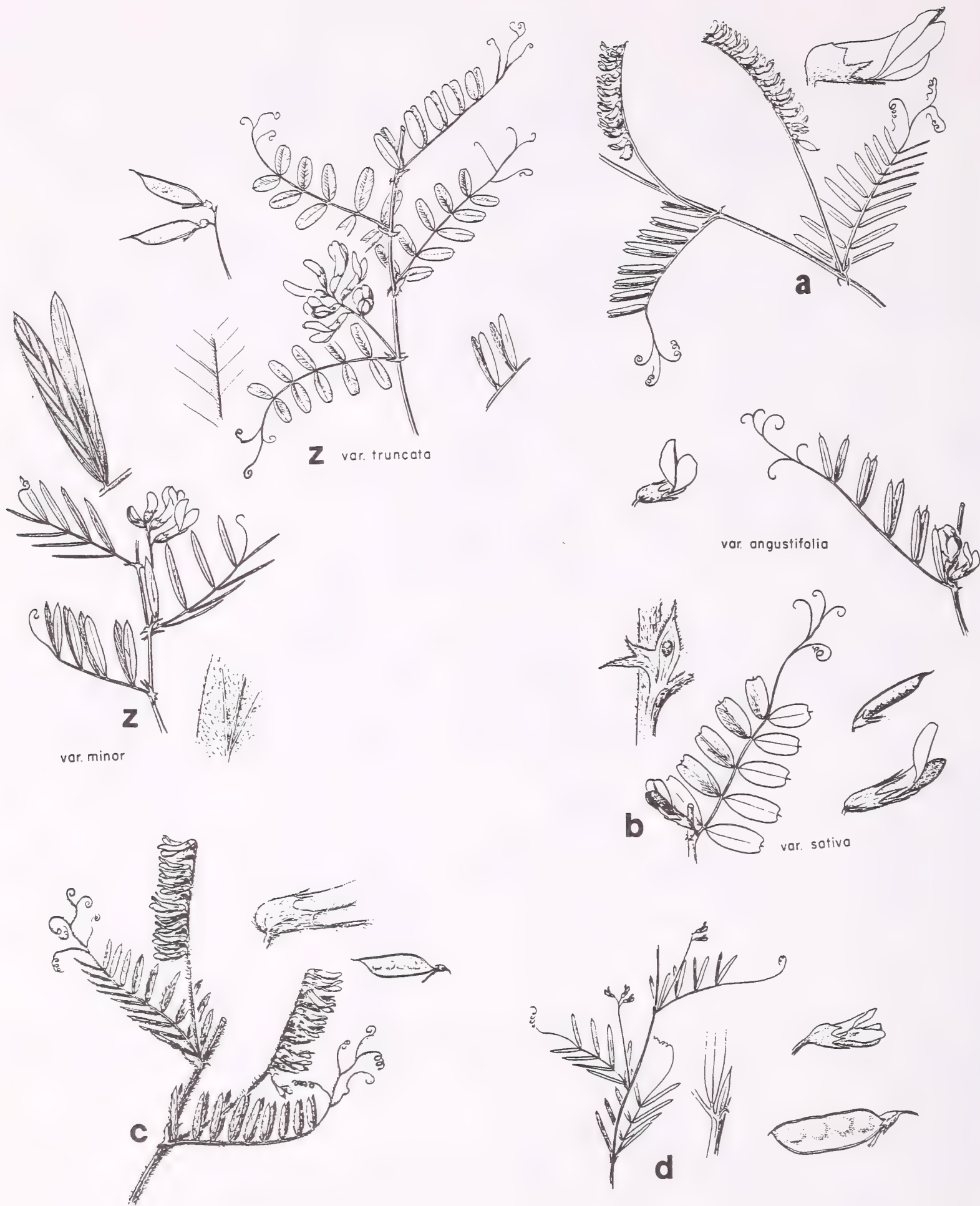
Hairy vetch is a robust annual or biennial, 0.5-2 m (20-80 in) tall, that is densely set with mostly long, soft, somewhat wavy hairs. Stipules are entire to toothed. The 10-20 leaflets are narrowly oblong to linear lance-shaped. The 20-60, reddish-purple flowers are densely arrayed on 1 side of the stalk.

This European introduction has commonly escaped, establishing along our railroad lines, roadsides, and abandoned orchards and waste areas.

5. Vicia tetrasperma (L.) Moench.

Smooth Tare

Smooth tare is a very slender-stemmed annual, 30-70 cm (12-28 in) tall, that is glabrous to sparsely long-hairy. Stipules are linear, 2-4 mm long, and entire but with a basal tooth. The 8-10 leaflets are linear to oblong, narrowing abruptly to a short point. Flowering stalks, with 1-3 lilac-blue flowers, are longer than the leaves.



z. *Vicia americana* a. *V. cracca* b. *V. sativa* c. *V. villosa* d. *V. tetrasperma*

This European native is an escapee primarily west of the Cascades, but it has been repeatedly found in hayfields in the northwest part of our area.

LENTIBULARIACEAE Bladderwort Family

Utricularia L. Bladderwort

Bladderworts are aquatic and carnivorous, normally with most of their parts submerged. Leaves, alternate or whorled, are 2- or 3-parted from the base and then irregularly and additionally 2-parted. Leaves act as traps for minute aquatic animals by means of small, valve-lidded bladders. Flowers are yellow or orange and 2-lipped with a sac or spur, resembling a snapdragon flower. The 1-few flowers are borne in a simple, erect and emergent inflorescence. Fruit is a small pod with many small wrinkled seeds.

1. Delicate plants with flowers <8 mm long, lower lip >2 times longer than spur; bladders few.....(2) U. minor
1. Stouter plants with flowers >14 mm long, lower lip <2 times spur, bladders many.....(1) U. vulgaris

1. Utricularia vulgaris L.

Common Bladderwort

Common bladderwort is a submersed, free-floating species with stems 1 mm or more thick. Leaves are alternate, mostly 2-parted at the base, and unevenly 2-parted and progressively reduced into cylindrical segments for the remainder of their length. Bladders of leaves are 1-3 mm wide. Yellow flowers, to 20 mm long, are borne emergent on a stout stalk.

A circumboreal species, it is common in slowly-moving or stagnant waters, such as sloughs of the Bitterroot River floodplains.

2. Utricularia minor L.

Little Bladderwort

Little bladderwort is a very delicate submersed plant with creeping stems. Leaves are only 3-10 mm long, finely 3-parted at the base, and thereafter 2-parted into slender, flat segments. The 2-9 yellow flowers, only 4-8 mm long, are arranged on an emergent stalk 4-15 cm (1.5-6 in) long.

This circumboreal plant, though inhabiting the same type of environments as U. vulgaris, is relatively rare; it is known only from the Lee Metcalf Wildlife Refuge near Stevensville.

LIMNANTHACEAE Meadowfoam Family

Floerkea Willd. False Mermaid

1. Floerkea proserpinacoides Willd.

False Mermaid

False mermaid is a slender annual with succulent stems, 2-10 cm (1-4 in) long, that are often branched below. The alternate leaves, 1-6 cm long, have slender petioles and blades pinnately divided into 3-5 narrowly oblong leaflets. Stalked flowers are borne singly in the axils of the leaves. Each bisexual flower has 3 sepals, 2-3 mm long, twice as long as the white petals. There are 3 or 6 stamens. The fruit is 2-4 mm long and consists of 2 rounded, bumpy lobes joined at the base.

False mermaid is rare in wet to moist, often shaded habitats in the valleys and foothills. It has been collected along Deer Creek, northeast of Missoula and in the northwest part of the Bitterroot Valley. Throughout most of U.S. and s. Can.

LINACEAE Flax Family

Linum L. Flax

Linum perenne L.

Wild Blue Flax

Wild blue flax is a slender, glabrous, several-stemmed and mostly unbranched perennial up to 60 cm (24 in) tall. Stem leaves are alternate, linear, and sharply pointed. Bright blue, 5-petaled flowers on slender stalks are solitary along the sparsely branched upper stem.

This species is found on dry, exposed, somewhat rocky slopes to productive grasslands and open ponderosa and Douglas-fir forests. It is more common in the foothills of the Sapphire Range than in the Bitterroot Mountains, and has been found at upper timberline but is uncommon there. Found throughout western North America and Eurasia.

LOASACEAE Blazing-star Family

Mentzelia L. Blazing-star

The common name, blazing star, actually describes only the two tall and showy biennials or short-lived perennials. The little known annuals are delicate and inconspicuous. Herbage is generally rough to the touch or with barbed, sometimes stinging hairs. The alternate, simple, entire to pinnately cleft and brittle leaves adhere to any foreign object contacted. Flowers are bisexual, radially symmetrical, and borne singly or in convex or flat-topped clusters.

1. Biennials to perennials with showy flowers, petals 1.5-8 cm long.....2
1. Annuals with inconspicuous flowers, petals < 1.5 cm long.....3
2. Petals apparently 10, the inner 5, actually modified stamens, are slightly narrower than outer 5.....(2) M. decapetala
2. Petals 5; 5 of outer stamens often flattened, much narrower than true petals.....(1) M. laevicaulis
3. Flower bracts mostly egg-shaped and inflorescence congested; leaves mostly entire to merely toothed.....(4) M. dispersa
3. Flower bracts mostly linear to lance-shaped and inflorescence not congested;.....(3) M. albicaulis

Group I. This group includes tall, conspicuous biennial plants.

1. Mentzelia laevicaulis (Dougl.) T. & G.

Blazing-star Mentzelia

Blazing-star mentzelia is a robust, sturdy plant, 30-100 cm (12-40 in) tall, with a strong taproot. Leaves are alternate. The lower ones are inversely lance-shaped and deeply pinnately and sinuately cleft, while the upper ones are sessile and less deeply lobed. Open only during daylight hours, flowers are lemon yellow, 2.5-8 cm (1-3 in) long, and are borne at the ends of the numerous branches.

This species is confined to hot and dry sites, almost invariably occurring on south-facing coulees slopes on the open western face of the Sapphire Range. From B.C. and e. WA to MT and south to CA, UT, and WY.

2. Mentzelia decapetala (Pursh) Urb. & Gilg.

Evening Star, Sand Lily

In general aspect evening star is similar to M. laevicaulis; however, its flowers open only in late afternoon and are fragrant. In addition, the 5 outer stamens are petallike.

This plant is relatively rare in our area, found only on southern foothills of the Sapphire Range. It is found mostly east of the Rocky Mountains but occurs sporadically in w. MT and ID.

Group II. This group includes two small, inconspicuous annuals that are difficult to distinguish. Both have yellow and very small flowers, whitish stems, and gray-green foliage. Positive identification requires seeds.

3. Mentzelia albicaulis Dougl.

White-stemmed Blazing-star

This simple to freely branched annual is 10-40 cm (4-16 in) tall with entire or shallowly toothed leaves 2-10 cm (1-4 in) long. The bracts subtending the inflorescence are narrowly to broadly lance-shaped. Seeds are irregularly shaped and bearing minute conical projections.

White-stem blazing star has been collected on Mormon Creek Road southwest of Lolo. It is usually found on dry sandy sites of desert valleys and foothills from B.C. south to CA and east to MT and NM.

4. Mentzelia dispersa Wats.

Small-flowered Blazing-star

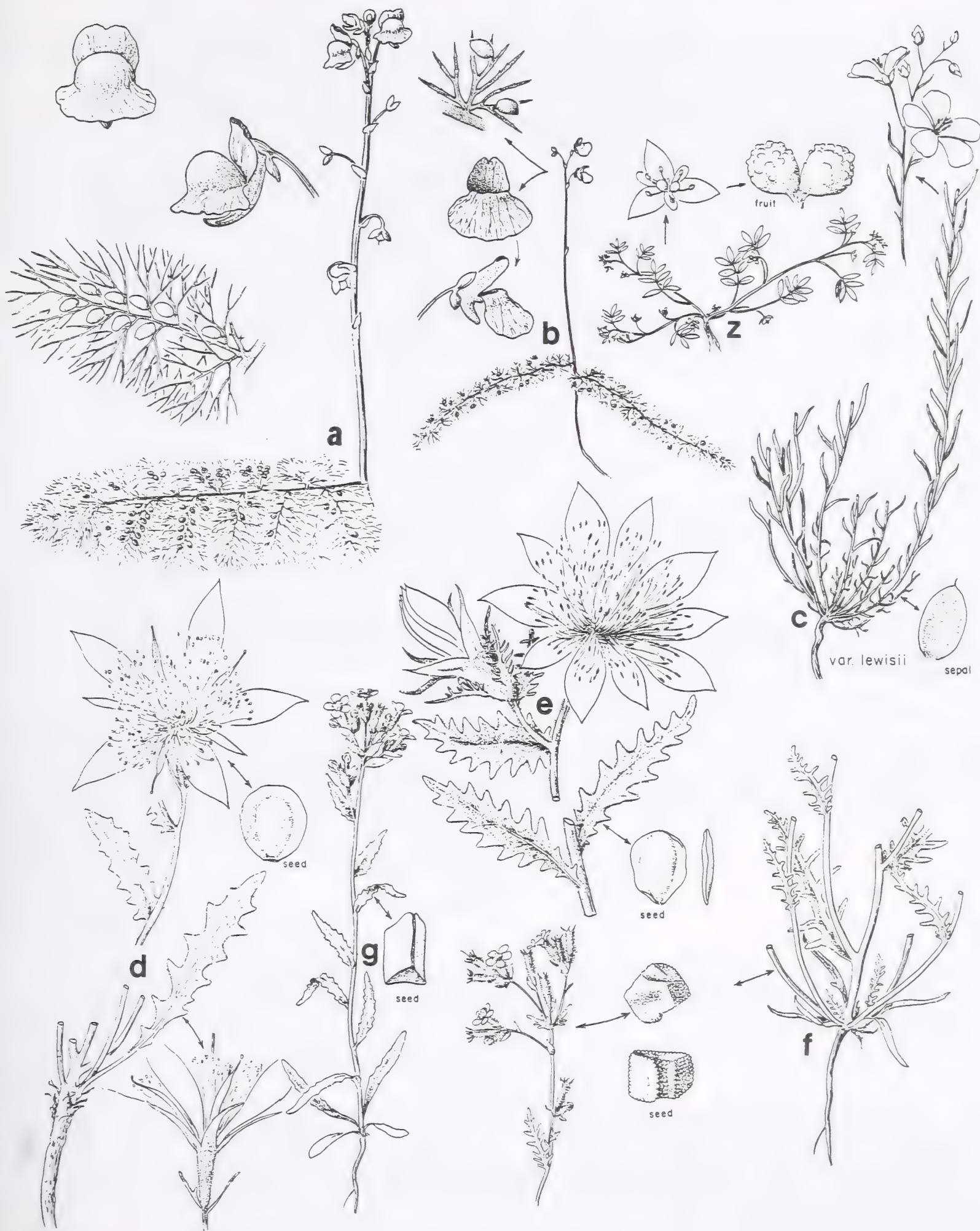
The floral bracts of small-flowered blazing-star are egg-shaped, sometimes with a long-tapering tip. The seeds are prism-shaped (having distinct faces) and lack a roughened surface (at least at 10X magnification).

It is known to be in the vicinity of Painted Rocks Reservoir of the Bitterroot's West Fork. It characteristically occurs on dry sites from the valleys to the lower mountain slopes from WA south to s. CA and east to MT, WY, and CO.

LORANTHACEAE (VISCACEAE) Mistletoe Family

Arceuthobium Bieb. Dwarf Mistletoe

Being exclusively parasitic on trees and shrubs, our dwarf mistletoes are shrubs lacking chlorophyll (non-green) and having leaves reduced to scales. Their presence causes swellings and distortions in the host tissue. Very small, yellowish to green, unisexual flowers are borne solitary in the leaf axils. Male and female flowers are borne on separate plants. Flowers of both sexes lack a calyx; the male (staminate)



a. *Utricularia vulgaris* b. *U. minor* z. *Floerkea proserpinacoides* c. *Linum perenne*
d. *Mentzelia laevicaulis* e. *Mentzelia decapetala* f. *M. albicaulis* g. *M. dispersa*

LYTHRACEAE

(staminate) flowers have a 3-parted corolla and 3 stamens, whereas female flowers have a corolla divided into 2 parts. Fruits are berries.

1. Flowers sessile or with female ones with slender pedicels up to 1 mm long, usually 2 per node; stems often more than 2 mm thick and seldom shorter than 3 cm.....(2) A. campylopodium
1. Flowers terminal on short lateral branches, those bearing male flowers with more than 2 per node; stems scarcely 2 mm thick and often <3 mm long.....2
2. Secondary branches of twigs lying in one plane, thus considered as a unit, flat or fan-like; stems between the nodes scarcely 1 mm thick; plants not parasitic on Pinus spp.....(3) A. douglasii
2. Secondary branches of twigs prominently whorled, not fanlike; stem between nodes at least 1 mm thick; plants not parasitic on Pseudotsuga, Abies or Picea.....(1) A. americanum

1. Arceuthobium americanum Nutt.

Pine Dwarf Mistletoe

This smooth, yellow-green, branched shrub is parasitic on lodgepole pine. It is tufted or spread along the host branches. Paired leaves are reduced to scale-like organs. The flower cluster is open and branching. The single, sticky seed of the small, swollen, bluish-green berry is forcibly expelled, and it sometimes lands and germinates on subtending branches.

Though the parasite itself is inconspicuous, the excessive growth (witches brooms) it stimulates in the host plant gives notice to its presence. It is widespread but not known to be an especially serious pest to our lodgepole populations. From B.C. south to CA, east to MT and south in the Rocky Mountains to NM.

2. Arceuthobium campylopodium Engelm.

Western Dwarf Mistletoe

[A. cyanocarpum (A. Nels. ex Rydb.) A. Nels.]

Stems of western dwarf mistletoe are highly-branched and whorled, usually tufted, orange-yellow to olive-green or brownish, and 1-2(4) mm thick at the internodes. The yellow, orange, or green male flowers are paired at the nodes and sessile. The 1-2 female flowers with pedicels less than 1 mm long are borne at the nodes.

Several forms of this species are recognized according to the species they parasitize. Our form, laricis (Piper) Gill, occurs on western larch in lower Bass Creek Canyon of the Bitterroot Mountains. Western dwarf mistletoe is widespread, from AK to Mex. and from the Pacific Coast to the east slopes of the Rocky Mountains.

3. Arceuthobium douglasii Engelm.

Douglas' Dwarf Mistletoe

This dwarf mistletoe is similar to A. americanum, but the stems are more greenish or bluish-green and with shorter and thinner segments barely 1 mm wide. Accessory branches arise in the same plane as the primary branches to form a fan. Greenish to yellow flowers are paired at the nodes on short pedicels.

Douglas' dwarf mistletoe is a common parasite of Douglas fir, and severe infestations can cause mortality and a significant loss in production. From B.C. south to CA, east to Alta. MT, CO, and NM.

LYTHRACEAE Loosestrife Family

Rotala L. Toothcup

Rotala ramosior (L.) Koehne

Toothcup

Toothcup is small, glabrous, erect to procumbent, simple or branched annual. White flowers are inconspicuous, borne solitary in the leaf axils.

A plant of wet sites, it was collected at one of the small ponds on the east bank of the Bitterroot River near Miller Creek.

MALVACEAE Mallow Family

The mallow family includes annual and perennial herbs with erect, ascending or lax stems. Leaves, with small appendages at the base of the petiole (stipules), are alternate, mostly lobed or incised, and predominantly round to kidney-shaped in outline. The often showy flowers are borne in narrow inflorescences originating from the leaf axils. The 5 fused sepals form the calyx and the 5 petals are fused to various degrees from the base upwards. Numerous stamens are united below to form a tube around the style. The 1- to several-seeded segments of the ovary are united in a ring around a central axis. These separate at maturity.

1. Stigmas filiform (long and slender).....2
1. Stigmas capitate (globe- or head-shaped).....3

2. A secondary involucre [whorl of bracts/leaves subtending flower(s)] above the primary one is lacking but 1-2 bracts may occur at base of flower stalk; stamens mostly in groups of 2-6.....Sidalcea
2. A secondary involucre of 3 bracts near base of or partially fused with calyx.....Malva
3. Petals red to deep salmon; leaves compound to merely toothed, 5-40 mm long.....Sphaeralcea
3. Petals light rose-purple to pinkish; leaves shallowly lobed, 20-150 mm long.....Iliamna

Iliamna Greene HollyhockIliamna rivularis (Dougl.) Greene

Mountain Hollyhock

Mountain hollyhock is a unique and stately perennial with 1-several stems up to 1.5 m (60 in) tall. All green plant parts are set with star-shaped hairs. Leaf shape is variable with at least some reminiscent of 3- to 7-lobed maple leaves. The lavender to pink flowers are arranged on stout stalks in rather dense axillary or terminal clusters. Blooming occurs from June through August.

This plant is often found along stream courses, in deep, moist but well-drained soil. It can also be found on disturbed sites such as clearcuts. It occurs throughout our area, but is not common. Mostly east of the Cascades from B.C. south to OR, east to MT and south to CO.

Malva L. Mallow

Both our species are introduced annual or biennial European weeds, thriving mainly in gardens, stockyards, and, to a lesser degree, on wasteland and along roadsides. They are inconspicuous, better distinguished by their distinctive fruits and seed than by flowers and leaves.

1. Carpels rounded and smooth on the back; petals 2-4 times longer than calyx.....(1) M. neglecta
1. Carpels flattened and wrinkled on the back; petals shorter to slightly longer than the calyx.....(2) M. parviflora

1. Malva neglecta Wallr.

Dwarf Mallow

This spreading, short-hairy perennial has stems mostly 20-60 cm (8-24 in) tall. Petiole length exceeds that of the kidney- to heart-shaped and inconspicuously 5- to 7-lobed blades. Flowers are pale blue-lavender to white with a shallowly lobed calyx that is 1/2 to 1/4 the length of the about 10 mm long corolla.

The dwarf mallow is much more common in our area than M. parviflora.

2. Malva parviflora L.

Alkali Mallow, Cheeseweed

Alkali mallow is a sparsely to densely short-hairy perennial with prostrate to spreading stems 20-60 cm (8-24 in) long. The kidney- to heart-shaped, 2-5 cm (1-2 in) long, and shallowly lobed to toothed blades are about 1/2 the length of the petioles. Lavender flowers are unstalked to long-stalked in the leaf axils.

The species is more common in eastern MT.

Sphaeralcea St. Hil. Globe-mallowSphaeralcea coccinea (Pursh) Rydb.

Red Globe-mallow

Red globe-mallow is a spreading and rhizomatous perennial 10-20 cm (4-8 in) tall. The palmately 3-parted leaves are again cleft to lobed. Upper leaf surfaces are yellow-green, whereas the lower are grayish. The stipules are soon deciduous. Bright orange to rusty-red flowers are arranged in short terminal inflorescences subtended by leaflike, reduced bracts.

It is found on dry grassland and shrubland communities of the west slope of the Sapphire Range (Corvallis Big Game Winter Range). This is primarily a Great Plains species extending into w. MT as far as Powell, Granite and Ravalli Counties.

MENYANTHACEAE Buck-bean Family

Menyanthes L. Bogbean, Buck-beanMenyanthes trifoliata L.

Bogbean, Buck-bean

The prostrate stems of bogbean are fleshy and grow from long shallow rhizomes. The naked flowering branches are ascending. The leaves have long petioles and are all basal, divided into 3 leaflets. Flowers, small, star-shaped, and whitish, are crowded into a short inflorescence. The purple-tinged corolla lobes are covered with short scales that extend down into the tube.



h. *Arceuthobium americanum* i. *A. camplyopodum* j. *A. douglasii* k. *Rotala ramosior*
 l. *Illiamna rivularis* m. *Malva neglecta* n. *M. parviflora* o. *Sphaeralcea coccinea*

Bogbean typically occurs on saturated substrates, often associated with Sphagnum mosses, Potentilla palustris, Carex limosa, and C. rostrata. In our area this species is uncommon, known only from Marys's Frog Pond on Elk Meadows Road, Lost Trail Pass Bog and scattered locations in the Sapphire Range. In North America from AK south to PA, IN, CO, and CA. A circumboreal plant.

MORACEAE Mulberry Family

Humulus L. HopHumulus lupulus L.

Hop

Hops are strongly twining, herbaceous vines with stems up to 4 m (17 ft) long. Both the stem and leaves are very rough to the touch. Serrate, 3- to 7-lobed leaves are opposite with heart-shaped bases, glandular undersides, and blades longer than the petioles. The small, green, unisexual flowers are borne in axillary clusters. There are both 5 sepals and stamens. Pistillate flowers droop in a bracteate spike. Each bract subtends two flowers, and, at maturity, enlarge to form a cone-shaped hop. The calyx and enclosed achene (small, dry, 1-celled and 1-seeded fruit) are dotted with yellow resinous granules.

This is a widely cultivated Eurasian plant. There is a large population on a railroad embankment south of Hamilton.

NYCTAGINACEAE Four-o'clock Family

Mirabilis L. Four-o'clockMirabilis nyctaginea (Michx.) MacM.

Heart-leaved Four-o'clock

This stout perennial has thick, fleshy roots and several branched, leafy stems up to 1 m (3 ft) tall. The opposite leaves have short petioles and egg-shaped to triangular, entire-margined leaves. Groups of 3 bisexual flowers, subtended by a membranous, 5-lobed, cup-shaped bract, are borne in open inflorescences at the ends of branches. The trumpet-shaped flowers, composed of 5 united, petal-like sepals, are pink and about 1 cm long. The 3-5 stamens extend beyond the sepals. The narrowly egg-shaped fruit is about 5 mm long with 5 longitudinal ribs.

A native of eastern Montana, it was once collected along a railroad embankment in Missoula. Alta. to Mex, east to the Atlantic.

NYMPHAEACEAE Waterlily Family

The family includes aquatic, perennial herbs producing all basal leaves that are large, entire, and long-petioled with deeply heart- to shield-shaped leaf blades. The showy, mostly floating flowers are bisexual and solitary on long peduncles. Fruits are leathery, many-seeded capsules.

1. Three (four) purplish sepals and petals; petioles attached to leaf center (leaves rounded)....Brasenia
1. Sepals and petals at least 4, greenish, yellow, or white; leaves with heart-shaped bases.....Nuphar

Brasenia Schreb. Water-shield, Water-targetBrasenia schreberi Gmel.

Water-shield

Water-shield is anchored to the substrate by slender rootstocks. All exposed portions, except the upper leaf surface, are covered with a gelatinous sheath. Leaf blades are very broadly elliptical or nearly round and arise mostly near the stem tops. Leaves are attached to the petiole in the center. Single flowers with 3 similar, purplish petals and sepals are borne on stalks 5-20 cm (2-8 in) long. Fruit is an oval-shaped achene 6-8 mm long.

Water-shield has been collected in Mudhole Lake above Watchtower Creek Canyon in the Bitterroot Mountains. From B.C. to CA, east over most of U.S. and s. Can., to Central America and other continents except Europe.

Nuphar J.E. Smith Cow Lily, Yellow Water Lily

These aquatic, perennial herbs have long-petiolate, large, heart-shaped and usually floating leaves that arise directly from the rhizomes. Showy flowers are borne solitary. The 5-12 egg-shaped sepals and 10-20 much smaller petals are regularly arranged around the flattened, sessile and scalloped-margin pistil.

1. Sepals usually numbering 6, 2.5-3.5 cm long; stamens yellow.....(2) N. variegatum
1. Sepals generally 9, 3.5-6 cm long; stamens mostly reddish or purplish.....(1) N. polysepalum



p. *Menyanthes trifoliata* q. *Humulus lupulus* qq. *Mirabilis nyctaginea* r. *Brasia schreberi*

1. Nuphar polysepalum Engelm.

Spatterdock, Indian Pond Lily

Spatterdock has mostly floating leaves, 10-40 cm (4-16 in) long, with distinctly round petioles up to 2 m (80 in) long. Relative to the 4-6 cm (1.6-2.8 in) long, mostly bright yellow sepals, the petals are inconspicuous and yellowish-green to purplish-tinged. Prominently ribbed fruits are 5-9 cm long.

Spatterdock is common in the shallow portions of many ponds and lakes, to an elevation of 2195 m (7,200 ft) in Lake Jerusalem in the Bitterroot Mountains. From AK to n. CA, east to Alta., SD, and CO.

2. Nuphar variegatum Engelm.

Yellow Water Lily

The floating leaves of yellow water lily are much like those of N. polysepalum but have flattened petioles and are slightly smaller. Flowers have yellow stamens and yellow to greenish petals (sometimes with reddish tips). Fruits are 3-5 cm (1.2-2 in) long.

This species is apparently rare in our area, having been collected only once. B.C. to e. Can., south to ne. ID, n. MT, and many of the northern tier of states.

OLEACEAE Ash or Olive Family

Fraxinus L. AshFraxinus pensylvanica Marsh.

Green Ash

Green ash is a deciduous tree, to 15 m (50 ft) tall, with a slender trunk and opposite, pinnately compound leaves. The 5-9 leaflets are lance-shaped and are often obscurely lobed. Fruits are winged nutlets (samaras), much like those of maples.

Green ash is native to e. MT and the Great Plains in general. Horticultural specimens have been the source of escapees seen along the Clark Fork River and Missoula's neighborhoods. (Not illustrated).

ONAGRACEAE Evening Primrose Family

The Evening Primrose Family includes annual or perennial herbs, or rarely subshrubs (herbs with woody bases). Leaves range from opposite to alternate and simple to pinnately divided. The often showy (rarely apetalous) flowers are bisexual and borne in leaf axils or in narrow terminal inflorescences. The calyx is mostly 4-parted (occasionally 2, 3, or 5), matched in number by the petals. Both the petals and sepals arise from the top of the ovary. Fruits are elongated capsules.

Circaea L. Enchanter's Nightshade, CircaeaCircaea alpina L.

Enchanter's Nightshade, Alpine Circaea

Enchanter's nightshade is a delicate perennial, up to 30 cm (12 in) tall, with glandular hairs in the upper portions and very slender rootstocks. Heart-shaped leaves are 2-6 cm (1-3 in) long, with subentire to sharply toothed margins and narrow, pointed tips. Flowers are inconspicuous with tiny, 2-petaled corollas.

A circumboreal species, it is most often associated with cool, moist and shaded sites along the east front of the Bitterroot Mountains. Occasionally it increases with disturbance. Despite the name, it is not an alpine species; rather it occurs predominantly in montane and lower subalpine zone of the Bitterroot Mountains and some of the canyons of the Sapphire Range. In North America from AK to Newf., south to CA, CO, and GA.

Clarkia Pursh Clarkia, GodetiaClarkia pulchella Pursh

Pink Fairies, Ragged Robin, Elkhorn Clarkia

This simple to branched annual has fine, short, stiff, appressed hairs throughout. The leaves are linear to narrowly lance- or spatula-shaped, 2-7 cm (1-3 in) long, and 1-8 mm broad. In flower, this is a unique and attractive plant; the 4 bright rose-purple petals are deeply notched, forming 3 lobes.

First collected in the vicinity of Kooskia, ID by the Lewis and Clark Expedition, this annual is one of our best known native plants. It is considered common, but the number of plants that germinate varies from year to year. It may seem abundant, coloring whole hillsides, or rare, when only a few plants flower. On the east side of the Cascades from s. B.C. to se. OR and east to ID and w. MT.



s. *Nuphar polysepalum* t. *N. variegatum* u. *Fraxinus pennsylvanica*

Epilobium L. Willow-herb, Willow-weed

This genus includes annual and perennial plants, with simple, sessile to petiolate, and willowlike leaves that are opposite below and become mostly alternate above. The bisexual flowers are borne stalked in elongated inflorescences. Ovaries are long and narrow and crowned by a short flower tube with 4 distinct petals and sepals. Fruits are long narrow pods that open by 4 slits to release the numerous, small, densely white-hairy, and wind-disseminated seeds.

One needs the whole plant, especially roots and pods to make positive identifications.

1. Stigma 4-cleft; petals yellow or at least 10 mm long or, both.....2
1. Stigma generally entire but if short lobed then petals never yellow and rarely as much as 10 mm.....3
2. Petals yellow.....(2) E. suffruticosum
2. Petals pink to purple.....(1) E. angustifolium
3. Plants annual and taprooted; mostly on well-drained soil.....4
3. Plants perennial, generally rhizomatous; on mostly moist to wet substrates.....5
4. Lower stem leaves opposite; seeds less than 1 mm long; plants mostly <40 cm tall.....(7) E. minutum
4. Nearly all leaves alternate; seed length at least 1 mm; plants 30-100 cm tall.....(8) E. paniculatum
5. Plants generally having gray cast due to very short, stiff, appressed hairs; producing turions (see Group III description); leaves linear to narrowly lance-shaped.....(6) E. palustre
5. Plants different from above.....6
6. Turions (see Group III description) generally present; seeds often with minute nipple-like projections.....(5) E. glandulosum
6. Turions lacking; seeds various.....7
7. Plants glaucous and hairless, or only inflorescence minutely hairy; stems matted....(4) E. glaberrimum
7. Plants generally hairy and not glaucous.....8
8. Stems mostly 30-100 cm (12-40 in) tall and freely branched above midlength; rhizomes short or lacking.....(9) E. watsonii
8. Stem rarely >30 cm (12) tall and if branched, then sparingly so near the base; rhizomes usually extensive and plants matted.....(3) E. alpinum

Group I. These are perennial species not easily confused with any others.

1. Epilobium angustifolium L.

Fireweed

Fireweed is the tallest species of the genus, bearing simple hairless stems, 1-2 m (40-80 in) tall, from rhizomelike roots. The mostly alternate leaves are narrowly lance-shaped. The showy rose to purple flowers are borne in terminal, many-flowered inflorescences.

The plant is a very common species of disturbed areas, such as logging and burned sites. Extremely dense populations of robust plants may result the first few seasons following forest fires on moist middle elevation sites. It may persist as a somewhat dwarfed, nonflowering component of closed forest sites. Fireweed can also occur as high as upper timberline as sterile shoots; flowering specimens have been reported from alpine larch stands at elevations approaching 2515 m (8,250 ft). Circumboreal, in North America from AK to CA, east to the Atlantic Coast.

2. Epilobium suffruticosum Nutt.

Shrubby Willow-herb

From the distinctly woody and spreading base rise many stems, about 25 cm (10 in) tall, that are densely covered throughout with short, white hairs. The mostly opposite leaves are sessile, entire, 1-3 cm long, and lance-shaped or elliptical. Petals are wedge-shaped, creamy-white to yellow and 7-10 mm long. They are notched at the tip and are borne in the axils of barely reduced upper-stem leaves.

This is the only rare Epilobium spp. in our area. It is known from collections made on rocky to gravelly banks of the Bitterroot River near Hamilton and the Clark Fork River west of Missoula. From central ID to MT, and WY.

Group II. Includes perennial, mostly mat-forming decumbent-stem plants less than 15 cm (6 in) tall that lack turions (scaly, bulb-like offsets of rootstocks giving rise to succulent shoots).

3. Epilobium alpinum L.

Alpine Willow-herb

[E. anagallidifolium Lam.]

A low, matted perennial spreading by rhizomes and stolons. It has ascending stems mostly less than 20 cm (8 in) tall. Leaves are 1-5 cm long, linear to egg-shaped, and sessile. Their arrangement shifts from all opposite below to all alternate above. The few, nodding to erect flowers have lilac to rose-pink or white petals.



v. *Circaea alpina* w. *Clarkia pulchella* x. *Epilobium angustifolium* y. *E. suffruticosum* z. *E. alpinum*

Alpine willow-herb is found on steamsides, talus slopes and high mountain meadows. We have varieties that differ in the following ways: Var. clavatum (Trel.) C.L. Hitchc., our most common high elevation Epilobium, is usually not over 10 cm (4 in) tall and has rose-pink flowers and club-shaped capsules. Var. alpinum, has linear capsules. Var. nutans (Hornem.) Hook. has diffuse, slender growth, and is taller than the above variety. It occurs mostly at or above timberline. Var. lactiflorum (Hauskn.) C.L. Hitchc. has white or very light pink flowers. It occurs much below timberline, mostly in the subalpine zone and is taller than the other varieties and has stronger venation and wider leaves that are up to 5 cm (2 in) long. Circumboreal, in North America throughout the mountains, as far south as south CA and CO and east to the n. Atlantic Coast.

4. Epilobium glaberrimum Barbey

Smooth Willow-weed

This plant has clustered stems, 10-50 cm (4-20 in) tall, and rootstocks that lack turions. Stems are glabrous below the inflorescence and the foliage has a whitish bloom. The sessile, entire, paired leaves are somewhat clasping and crowded on the stem. The are broadly lance-shaped with rounded tips. Flowers are lilac-pink.

Our common variety, fastigiatum (Nutt.) Trel. occurs at higher elevations and has more numerous and crowded, entire leaves than does the var. glaberrimum, which is more common to the west. Both varieties occur on wet sites; from B.C. south in the Olympic and Cascade Mountains to s. CA, east to ID, w. MT, and UT.

Group III. This group includes perennial, non-matted plants bearing turions (leafy winter buds giving rise to succulent shoots).

5. Epilobium glandulosum Lehm. [E. ciliatum Raf.]

Common Willow-herb

Careful excavation will reveal the globe-shaped turions that are the surest way of discriminating common willow-weed from the very similar E. glaberrimum (which is never matted). The stems are often clustered or branched above and rather glandular-hairy in the upper parts. Leaves are paired below and rather closely spaced, barely petiolate, shallowly toothed, and up to 12 cm (6 in) long. Individual flower stalks are up to 3 cm (1.3 in) long.

Our var. macounii (Trel.) Hitchc., occurs on moist sites from the montane to timberline, but is more common in the subalpine zone and below. The var. tenuis (Trel.) Hitchc., does not have the stem hairs arranged in lines and is rare in our area. From AK south to s. CA and in the Rocky Mountains south to CO, and east to the Atlantic Coast.

6. Epilobium palustre L.

Swamp Willow-herb

Swamp willow-herb has small turions at the ends of slender rhizomes and slender, simple to sparingly branched stems up to 40 cm (16 in) tall. The high density of short, fine, white, appressed hairs is responsible for the gray to silvery cast of the foliage. The mostly paired, entire leaves are 5 mm or less wide and 2-6 cm (0.8-2.4 in) long, and narrowly strap- to lance-shaped. Flowers with notched, pink to purple or white petals mature to gray-hairy pods 3-6 cm (1-2 in) long.

As indicated by the common name, this species grows in swamps, marshes, and wet meadows, mostly at lower elevations. It is uncommon to rare in the Bitterroot Mountains. From AK south to the WA Cascades, in the Rocky Mountains as far south as CO, and east to the Atlantic Coast.

Group IV. These are annual or perennial plants, flowering at the end of their first year. They may be weedy.

7. Epilobium minutum Lindl.

Small-flowered Willow-herb

This is a much-branched, slender annual that is 30-40 cm (12-16 in) tall and appressed-hairy throughout. The lower stem leaves are mostly opposite, short-petiolate, and have blades 1-2.5 cm long. The whitish to pink flowers are borne in the axils of the slightly reduced and unpaired upper stem leaves.

Small-flowered willow-herb is widespread on dry, sandy to gravelly or rocky soils at predominantly lower elevations. From B.C. to CA and east to MT.

This species can be confused with Gayophytum spp. but has much longer capsules.

8. Epilobium paniculatum Nutt.

Tall Annual Willow-herb

This freely branched annual is superficially similar to E. minutum, but it is much taller (30-100 cm, 12-40 in), and the leaves are unpaired throughout. The entire to finely toothed leaves are narrowly lance-shaped to linear, while those of the main stem are 3-7 cm long, much larger than those borne in bunches in the main leaf axils. Lax, few-flowered inflorescences terminate numerous branches.

Tall annual willow-herb is common on dry soils and typically occurs in open ponderosa pine stands. It is distributed throughout the w. U.S.

9. Epilobium watsonii Barbey
[E. ciliatum Raf.]

Watson's Willow-herb

Watson's willow-herb is about as tall as the above species but coarser in all features. Though perennial, it often flowers the first season. It spreads by short rootstocks that produce rosettes of leaves. The 30-100 cm (12-40 in) tall stems vary from hairless to densely pubescent and are usually glandular above. The finely toothed leaves are highly variable but mostly opposite below and narrowly to broadly lance-shaped. Typically clusters of smaller leaves occur in the axils of the lower main stem leaves. Pods are narrow, stalked, and 4-8 cm long.

This plant is common in marshes, swamps, and other sites with mostly saturated soil (at least in the early growing season). It is the most common Epilobium in the meadows of the floodplains and has become a weed in many areas. Well-distributed from AK south throughout U.S.

Gaura L. Gaura, Butterfly-weedGaura coccinea (Nutt.) Pursh

Scarlet Butterfly-weed

This perennial has several, usually decumbent to ascending stems. The unpaired leaves are sessile and linear to oblong lance-shaped. The showy blossoms are arranged in many-flowered spikes and range in color from white to pink or red; flower color changes with developmental stage.

Scarlet butterfly-weed is a well-known Great Plains species. It has been recorded from the Mount Sentinel, Mount Jumbo and Dean Stone Mountain east of Missoula.

Gayophytum Juss. Groundsmoke, Gayophytum

This genus is comprised of inconspicuous, fragile, weedy-looking, small annuals that are much more common than our collections indicate. Stems are freely branched and slender with lance-shaped to linear, alternate, and entire leaves. The small flowers have distinct, reflexed sepals, white to pink petals, and 8 stamens. Fruits are linear to club-shaped capsules.

1. Petals mostly 3-5(7) mm long.....(1) G. diffusum
1. Petals mostly less than 3 mm long.....2
2. Stalks of mature fruits (capsules) <3 mm long.....3
2. Stalks length of mature capsules 3 mm or more.....4
3. Ovary hairless or minutely glandular; 2 opposite of the 4 valves remain attached to septum at maturity; long axis of seeds oblique to main axis of capsule.....(3) G. humile
3. Ovary hairless or pubescent; all 4 valves free from septum at maturity; long axis of seeds oriented parallel to capsule main axis.....(4) G. racemosum
4. Petals <1.5 mm long; length of capsule stalk equal or exceeding capsule.....(2) G. ramosissimum
4. Petals 1-3 mm long; capsule stalk shorter than capsule itself.....(1) G. diffusum

Group I. These are species with stalked capsules. They are branched above, and the internodes are longer than the leaves.

1. Gayophytum diffusum T. & G.

Spreading Groundsmoke

This annual is 15-60 cm (6-24 in) tall with stems that are branched above and vary from hairless to densely mantled with soft spreading or short, straight, appressed hairs. Leaves are linear to inversely lance-shaped, 15-50 mm long and 1-2(7) mm broad. The twisted, capsules are 4-12 mm long, glabrous to soft-hairy, and pointed upward.

Our collections of spreading groundsmoke range from 1675 m (5,500 ft) at Wheeler Creek (West Fork Bitterroot River drainage) to 2225 m (7,300 ft) at the head of Martin Creek in the Sapphire Range. From WA east of the Cascades south to s. CA and east to ID.

2. Gayophytum ramosissimum T. & G.

Hairstem Groundsmoke

This glabrous annual, 15-40 cm (6-16 in) tall, is freely and diffusely branched. The linear lower stem leaves are mostly 10-35 mm long, and leaf size is gradually reduced up the stem to the linear floral bracts. Pedicels are fine, threadlike, and spreading to erect during flowering but distinctly bent downward in fruit.

Hairstem groundsmoke has been collected in the dry foothills near Darby. Typical sites include open slopes that may have abundant early season moisture. From WA, mostly east of the Cascade crest, south to s. CA and east to MT and CO.



a. *Epilobium glaberrimum* b. *E. glandulosum* c. *E. palustre* d. *E. minutum* e. *E. paniculatum* f. *E. watsonii*
g. *Gaura coccinea*

Group II. These species are branched from the base and have unstalked capsules and leaves longer than the internodes.

3. Gayophytum humile Juss.

Dwarf Groundsmoke

This low-growing annual is 5-20 cm (2-8 in) tall and smooth to gray-hairy. Leaves are densely set, linear to narrowly spatula-shaped, and 5-30 mm long by 1-2 mm broad. Floral bracts nearly as large as stems leaves nearly conceal the flowering spikes. Petals are about 1 mm long, and the seeds are 0.5-0.75 mm long.

Dwarf groundsmoke has been collected from 1645 m (5,400 ft) near Victor and 2135 m (7,000 ft) at Burnt Fork Lake. From WA east of Cascades south to s. CA (and Chile) and east to ID and W. MT.

4. Gayophytum racemosum T. & G.

Racemed Groundsmoke

This species is similar to G. humile but differs by having longer seeds (to 1 mm) with their long axis parallel to that of the capsule and having all 4 chambers free from the central axis at maturity.

Racemed groundsmoke has been collected in the dry foothills near Darby and from the Selway-Bitterroot Divide at 2350 m (7,710 ft), Pintler Pass at 2665 m (8745 ft), and several other high elevation sites. Mostly east of the Cascade crest in WA south to s. CA, east to MT and CO.

Oenothera L. Evening-primrose

This genus includes annual, biennial, and perennial herbs often lacking leafy stems. The leaves are all basally clustered or alternate, mostly narrowly lance-shaped and simple to pinnately divided. The white or yellow, often nocturnal and/or fragrant flowers are borne in various types of inflorescences. There are 8 stamens, 4 sepals, and 4 petals; the stigma is globe-shaped to deeply 4-lobed and the hypanthium (elongation or enlargement of the floral axils below the calyx) is prominent. Fruits are woody to membranous, 4-celled, and straight to somewhat coiled capsules.

1. Flowers borne on or among basal rosettes of leaves; flowering stems, if any, short and concealed by the leaves and flowers; hypanthium several times longer than the ovary; all perennials.....2
1. Flowers on leafy stems; hypanthium often shorter than ovary; perennial, biennial, or annual.....5
2. Petals white or yellow, aging to pink or purple, 10-50 mm long; stigma lobes linear, mostly >3 mm....3
2. Petals yellow and not aging to purple, <20 mm long; stigma globe- or disc-shaped.....4
3. Petals yellow, aging to purple, 10-20 mm long; woody capsules with winged margins, 10-20 mm long.....(1) O. flava
3. Petals white, aging to pink or purple, 25-45 mm long; capsules angled, not winged, 10-40 mm long.....(4) O. caespitosa
4. Leaves margins entire to rounded-toothed or lobed, hairless or nearly so (only on margins and veins); capsules smooth.....(3) O. subacaulis
4. Leaves pinnately divided (more than 1/2 way to midrib); foliage with short, stiff and appressed hairs; capsules hairy.....(2) O. tanacetifolia
5. Petals up to 5 mm long; plants annual.....(5) O. andina
5. Petals >10 mm long; plants biennial or perennial.....6
6. Petals mostly 10-20 mm long, seldom fading to reddish cast; plants grayish with appressed, short, and stiff hairs.....(6) O. strigosa
6. Petals mostly 25-40 mm long, generally fading to reddish cast; plants with stiff, upright hairs.....(7) O. perennis

Group I. The following species are perennials with flowers that are borne sessile or nearly so from the top of the rootstock.

1. Oenothera flava (A. Nels.) Garrett

Long-tubed Evening-primrose

The leaves of this tufted perennial are 5-20 cm (2-8 in) long and up to 5 cm (2 in) broad. The evening-blooming flowers have yellow petals, aging to a purple hue. The egg-shaped, woody capsule is prominently 4-winged.

This plant is usually associated with vernal pools and hard-packed soils. In our area it has been collected at Fairview, south of Missoula. From Sask. south to Mex., west to ID and CA.

2. Oenothera tanacetifolia T. & G.

Tansey-leaved Evening-primrose

Tansy-leaf evening-primrose is a thickly taprooted, tufted perennial with yellow petals that age to a reddish hue. The oblong to egg-shaped capsules are 15-20 mm long, leathery-textured, hairy, and 4-sided with barely raised wings.

This species has only been collected once in our area, on a foothill slope east of Victor. Generally found on substrates moist in spring or early summer, but drying in summer, such as sagebrush steppe and open ponderosa pine forests. From WA east of Cascades south to the Sierras of CA, east to ID and MT.

3. Oenothera subacaulis (Pursh) Garrett Long-leaf Evening-primrose
[Camissonia subacaulis (Pursh) Raven]

This plant differs from the above two by having flowers that do not open in the evening and yellow petals that do not fade to purple with age. Capsules are distinctly 4-angled, not winged.

Long-leaf evening-primrose is known from Bertie Lord Creek near its confluence with the East Fork Bitterroot River. This species is generally found in open habitats, moist in spring to early summer and dry by midsummer. From e. WA to the Sierras of CA, east to MT and CO.

4. Oenothera caespitosa Nutt. Rockrose, Tufted Evening-primrose

The rockrose usually lacks stems, but occasional plants may be up to 25 cm (10 in) tall. The 10-25 cm (4-10 in) long basal leaves are slenderly petioled and inversely lance-shaped in outline, the blade pinnately cleft to merely toothed or nearly entire. The large, handsome flowers open in the evening to perfume the air. They have heart-shaped, white petals that age to pink. Fruits are egg-shaped and angled (not winged) capsules 10-40 mm long.

Rockrose occurs over much of the western U.S. on talus and dry hills. In our area it has been recorded in the foothills east of Victor.

Group II. This is our only annual species.

5. Oenothera andina Nutt. Obscure Evening-primrose
[Camissonia andina (Nutt.) Raven]

This small annual is wider than tall with flowering stems up to about 15 cm (6 in) tall. The simple or forked branches are ascending. The linear to narrowly spatula-shaped, alternate leaves are mostly basal, but the lower branches are nearly leafless. The lemon yellow flowers, about 2 mm long, are borne sessile in short, crowded, bracteate spikes.

Our only record for this species is a population on the dry, south-facing slopes of Mount Sentinel. East of the Cascades from B.C. south to CA, east to WY and UT.

Group III. These two species have erect, leafy stems and yellow flowers.

6. Oenothera strigosa Mke. & Bush Common Evening-primrose
[O. villosa Thunb.]

Common evening-primrose is a grayish-hairy, erect, strongly taprooted biennial 30-100 cm (12-40 in) tall. Leaves are lance-shaped and 10-25 mm broad with entire or undulating margins. The upper ones are progressively reduced. The large, yellow flowers open in the evening, dispersing a delicate fragrance.

This most common of our evening-primroses is found on a broad variety of habitats, from riparian zones to roadsides and wastelands throughout most of the Northwest and to the Atlantic Coast. Roots of the first year rosettes make delicious vegetables when harvested in the fall or spring.

7. Oenothera perennis L. Sundrops

This weedy perennial has erect stems to 25 cm (10 in) tall and a nodding inflorescence that becomes erect with the blooming of each flower. The lance-shaped leaves are mostly sessile and up to 10 cm (4 in) long. The yellow petals are 15-25 mm long.

A native to e. Can. and ne. U.S., where it is a common weed of pastures. Our only collection is from a barrow pit near Hamilton. (Not illustrated).

OROBANCHACEAE Broomrape Family

Orobanche L. Broomrape

All species parasitize the roots of other plants. These fleshy annuals are yellowish- to purple-colored and have leaves reduced to alternate, bract-like scales. The calyx is 4-5-lobed and the corolla is tubular and slightly curved with 5 lobes formed into two lips. Numerous minute seeds are borne in pods.

1. Flowers sessile or on pedicels <30 mm long and in addition to the subtending bract have a pair of bractlets just below the calyx.....(3) O. corymbosa
1. Flowers all somewhat long-stalked and lacking small subtending bracts.....2



h. *Gayophytum diffusum* i. *G. ramosissimum* j. *G. racemosum* k. *G. humile* l. *Oenothera flava*
m. *Oenothera tanacetifolia* n. *O. subacaulis* o. *O. caespitosa*

2. Flowers no more than 2-3, usually 1, the short stems remaining underground; petals rounded; sepals narrow and slender.....(1) O. uniflora
2. Flowers more than 3; the top of stems emerging from ground; petals pointed; sepals triangular.....(2) O. fasciculata

1. Orobanche uniflora L.

One-flowered or Naked Broomrape

The 1-3 leafless flower stalks, up to 9 cm (4.3 in) long, are borne on short, fleshy, underground stems. Narrowly pointed sepals subtend a yellowish to bluish-purple corolla tube with rounded lobes.

This fragile plant is sparsely distributed throughout our mountain ranges, occurring in moist to wet, often seepy, partly shaded, mountainous environments, sometimes at high elevations. It is believed to parasitize a great variety of host plants, such as Senecio triangularis, Suksdorfia ranunculifolia, Saxifraga integrifolia and Boykinia). From Yuk. to Newf., south to CA and FL.

2. Orobanche fasciculata Nutt.

Clustered Broomrape

This species is glandular throughout and produces solitary or clustered, mostly fleshy and stout stems about 6 cm (2 in) long. These bear several 1-flowered stalks that are not longer than the main stem. Flowers are yellowish or pinkish.

This is a species of dry, open valley and foothill habitats. In our area it parasitizes Artemisia frigida and A. tridentata. However, the only known locations are near Corvallis and on Blue Mountain in the Missoula vicinity. From B.C. east to Sask, MI, and IN and south to NM and CA.

3. Orobanche corymbosa (Rydb.) Ferris

Flat-topped Broomrape

Flat-topped broomrape has several short, bracteate flower stalks, each with 2-several flowers. The stems are thick and sturdy and bear pedicels up to 3 cm long with purplish flowers. The 5 very narrow and linear calyx lobes considerably exceed the length of the calyx tube and are themselves subtended by two narrow bracts.

This is a rare plant of dry sites, commonly parasitic on Artemisia tridentata; it has been collected only once near Missoula. From s. B.C. south (wholly east of Cascades) to CA, east to w. MT and UT.

OXALIDACEAE Oxalis Family

Oxalis L. Wood-sorrel, Oxalis

These herbaceous perennials have basal, alternate or nearly opposite, 3-parted leaves. Flowers are mostly bisexual, bilaterally symmetrical and borne solitary or in a short, broad and somewhat flat-topped inflorescence. Calyx and corolla (always yellow) have 5 petals and sepals and 10 stamens. Fruit is a capsule with 5 lobes and chambers. Three weedy species have been introduced in Missoula and vicinity.

1. Hairs of stem and petioles usually at least partly septate, blunt at tip; plants rhizomatous; stipules lacking.....(3) O. stricta
1. Hairs of stem and petioles not septate and pointed at tip; plants more stoloniferous than rhizomatous; stipules present.....2
2. Seeds with transverse whitish ridges; plants with tufted growth-form.....(2) O. dillenii
2. Transverse ridges of seeds not white; main stems creeping and rooting.....(1) O. corniculata

1. Oxalis corniculata L.

Creeping Yellow Wood-sorrel

Creeping yellow wood-sorrel, a hairless to short-hairy perennial has trailing stems, not taller than 10 cm (4 in), that freely root at the nodes. Herbage is mostly brownish, reddish or purple. Leaflets are inversely heart-shaped. The peduncles are 2-5 flowered, and the capsules are 15-25 mm long with gray, appressed, and short hairs.

This weed of European origin, now widespread in North America, has escaped from greenhouses to become persistent in lawns and gardens of Missoula.

2. Oxalis dillenii Jacq.

Dillen's Wood-sorrel

Dillen's wood-sorrel is very similar to O. corniculata, differing by always having light green foliage, a more erect, less trailing growth form, and whitish crests on the small cross-ridged seeds.

This species is a native weed widespread in the eastern U.S. and locally common in gardens of the lower Rattlesnake Creek drainage.

3. Oxalis stricta L.

Upright Yellow Wood-sorrel

Stems are usually upright and up to 50 cm (20 in) tall, but may be decumbent or matted. They arise from fleshy, spreading rhizomes that range from hairless to having blunt-tipped, partitioned hairs.



p. *Oenothera andina* q. *O. strigosa* r. *Orobanche uniflora* s. *O. fasciculata* t. *O. corymbosa*
 u. *Oxalis corniculata* v. *O. dillenii* w. *O. stricta*

Petioles lack appendages (stipules) at the base. Leaflets are 10-50 mm long and hairless or with hairs confined to the margins.

Rhizomes of this species are difficult to eradicate, making it a troublesome native weed. In our area it has been collected only northeast of Hamilton.

PAPAVERACEAE Poppy Family

Members of the poppy family are annual to perennial herbs often having colored or milky juice and alternate or basal, entire to palmately or pinnately dissected leaves. Flowers are solitary to several with 2-3 sepals shed as the flower opens and mostly 4 (6-12) petals that are white, yellow, red, or bluish. The stamens are usually abundant but occasionally only 3.

1. Leaf blades bristly hairy.....Papaver
1. Leaf blades glabrous to sparsely hairy.....Chelidonium

Chelidonium L. CelandineChelidonium majus L.

Celandine

Celandine is a biennial or short-lived perennial up to 60 cm (24 in) tall with stems and roots that exude a orange-yellow sap when cut. Leaves are compound with 2-5 irregularly lobed and toothed leaflets. Flowers are yellow and 4-petaled. Elongated, seed pods have a rounded base and pointed tip and open lengthwise in 2 sections.

Celandine, an exotic from Europe, has been collected at the Montana Power Rattlesnake Creek Reservoir north of Missoula. (Not illustrated).

Papaver L. Poppy

Poppies are annual or perennial herbs with colored or milky juice and alternate or all basal leaves that are lobed or pinnately dissected. Showy, 4-petaled flowers are solitary and borne on the ends of the stems.

1. Capsules (fruits) nearly round to broadly egg-shaped and without hairs; petals 40-70 mm..(2) P. rhoeas
1. Capsules narrowly oblong to egg-shaped, with stiff hairs; petals 15-20 mm long.....(1) P. argemone

1. Papaver argemone L.

Long Prickly-headed or Sand Poppy

This erect, 15-50 cm (6-20 in) tall annual has coarse, stiff hairs throughout. Leaves are twice pinnately dissected. Egg-shaped petals are scarlet with black bases. Capsules, 15-20 mm long, oblong, and prominently ribbed, are set with stiff bristles.

This is a European annual that often escapes from cultivation but seems not to persist except at scattered locations.

2. Papaver rhoeas L.

Corn or Field Poppy

Field poppy is an erect, branched, bristly-hairy annual 30-70 (12-28 in) tall. Leaves are once pinnately divided and coarsely toothed. The scarlet petals have a dark blotch at their base. The capsules are smooth, nearly round to egg-shaped, and 10-15 mm long.

Field poppy is a widely cultivated species that has been introduced in our area in grain seed near Hamilton. Its capacity to persist is unknown.

PLANTAGINACEAE Plantain Family

Our species are annual or perennial herbs with simple, entire or toothed, and mostly basal leaves. The bisexual flowers are arranged in a condensed spike (flowers sessile on axis) subtended by bracts. The calyx, corolla, and stamens are generally in 4's, and the corolla lobes are united. Fruits are capsules that open at the tip to release the several seeds.

Plantago L. Plantain

Characteristics of this lone genus are detailed in the family description above.

1. Plants evidently perennial.....2
1. Plants plainly annual.....4

PLANTAGINACEAE

2. Ovules and seeds 6-30; leaves broad, the blade well-defined and broadly elliptical to heart or egg-shaped; plants not woolly at base; seeds with net-like pattern.....(1) *P. major*
2. Ovules, seeds 2-4; leaves narrower, the blades elliptical or narrower, 2.5-10 times wider than long; plants often woolly at base; seeds >1 mm long and not net-veined.....3
3. Outer 2 sepals united; bracts generally narrowed to a point.....(2) *P. lanceolata*
3. Outer sepals free; bracts mostly blunt or rounded to acute.....(3) *P. hirtella*
4. Capsules (fruits) with 4-6 seeds; stamens mostly 2; leaves seldom as much as 3 mm wide; inflorescence completely hairless.....(5) *P. elongata*
4. Capsules with 2 seeds; stamens 4; leaves often >3 mm wide; inflorescence sparsely to densely long-hairy.....5
5. Bracts mostly inconspicuous and not much elongated, not blackening in drying.....(4) *P. patagonica*
5. Bracts very elongated, far exceeding the flowers of the spike and blackening in drying.....(6) *P. aristata*

Group I. Included here are the cosmopolitan weeds originally introduced from Eurasia.

1. *Plantago major* L.

Common or Nippleseed Plantain

A large mass of fibrous roots gives rise to several, stiffly erect, naked, flower stalks about 30 cm (12 in) tall. The surrounding basal leaves are somewhat appressed to the ground. Leaves have a purplish petiole, about 10 cm (4 in) long, that sheaths the stem and an entire to toothed blade that is egg-shaped, prominently veined, and about the same length as the petiole. Young leaves are often hairy but become glabrous with age. The capsule is egg-shaped, 2-4 mm long, and splits at about the middle or below.

Our commonly occurring var. *major*, is a cosmopolitan weed of lawns, gardens, irrigated land, and moist meadows. The native var. *pachyphylla* Pilger, distinguished by thicker, succulent leaves, is believed to occur in several places along the Bitterroot River.

2. *Plantago lanceolata* L.

English Plantain

This fibrous-rooted perennial has a short, stout, and woody base that is woolly at the crown. Leaves are 10-40 cm (4-16 in) long and have lance-shaped or elliptical blades that are entire or minutely toothed and taper gradually to the petiole. The several, leafless flowering stems are 15-60 cm (6-24 in) tall, with appressed, stiff hairs and a dense cylindrical spike at maturity. The capsules, 3-4 mm long, have 1(2) blackish, shining, and concave seeds.

English plantain, a cosmopolitan species, occupies the same habitats as does *P. major*, but tends to occur at higher elevations and on more exposed sites.

3. *Plantago hirtella* H.B.K.

Mexican Plantain

Mexican plantain has elliptical or inversely lance-shaped and firm to succulent leaves that have copious, short, stiff to very rigid hairs, giving them a grayish-green cast. The leafless flower stalks, 5-40 cm (2-16 in) tall, are topped by dense spikes, 5-25 cm long and about 10 mm wide. The corolla lobes form a persistent, closed beak over the capsules.

The species ranges from South America along the Pacific Coast as far north as Grays Harbor County, WA.; in our area it has been recorded from Sleeping Child Hot Springs, southeast of Hamilton.

Group II. This group includes annual plants widespread in the U.S.

4. *Plantago patagonica* Jacq.

Indian-wheat

Indian-wheat is a weakly taprooted annual, 5-20 cm (2-8 in) tall, that is densely thatched with long, soft, wavy hairs. Leaves are mostly 3-nerved and linear to inversely lance-shaped and tapered gradually toward both ends. The densely crowded spike is 1.5-10 cm long, less than 1 cm wide, and has a felt of long woolly hairs.

This species is common on the dry, overgrazed foothills, often occurring in large populations of very small plants. Var. *spinulosa* (Dcne.) Gray, with long, narrow, tapered bracts has been collected only once near Missoula. From s. B.C. to Sask., south to CA and TX and introduced to points further east.

5. *Plantago elongata* Pursh

Slender Plantain

Slender plantain is a small, slender, annual herb, less than 20 cm (8 in) tall. Leaves are succulent, narrowly linear, and 2-10 cm (1-4 in) long. The flowering stalk is longer than the leaves, and the spike is 1-10 cm (1-4 in) long and less than 5 mm wide. Flowers are densely aggregated or so loosely flowered that the stem is exposed. Bracts are fleshy and triangular to egg-shaped.

The plant was collected on the thinly vegetated west-facing slopes of the Sapphire Range east of Victor; more usually it is associated with somewhat saline sites. From s. B.C. to s. CA, east to Sask., W. MN, and TX.



x. *Papaver argemone* y. *P. rhoeas* z. *Plantago major* a. *P. lanceolata* b. *P. hirtella* c. *P. patagonica*
d. *Plantago elongata*

POLEMONIACEAE

6. Plantago aristata Michx.

Large-bracted Plantain

This species is an annual or occasionally short-lived perennial herb similar to P. patagonica, but it has much longer floral bracts, that extend 5-25 mm beyond the flowers and become black upon drying. These bracts are gradually reduced toward the apex, giving the inflorescence a conical shape.

Large-bracted plantain has been collected only once near Missoula; it is normally associated with dry, open places, especially disturbed sites. Native to the midwest, it is now naturalized over most of the e. U.S. and se. Can. and as far west as the w. slopes of the Cascades.

POLEMONIACEAE Phlox Family

Members of the Phlox Family include annual and perennial herbs and low-growing, woody-based subshrubs. Leaves are opposite or alternate and undivided with entire margins to compound or variously divided. The bisexual and radially symmetrical flowers are solitary or open to congested inflorescences. Both sepals and petals are 5-parted and partially fused; the 5 stamens are partially fused to the corolla tube. Fruits are capsules.

1. Calyx tube of nearly uniform texture; leaves never without petiole and palmately divided to near base.....2
1. Calyx tube with green ribs alternating with transparent areas or if uniformly greenish, then the leaves lacking petioles and palmately divided to near base.....3
2. Leaves pinnately compound.....Polemonium
2. Leaves simple and mostly entire or trilobed.....Collomia
3. Stamens attached to corolla at different levels; leaves entire or with fringe of hairs on margins, some or all of them opposite.....4
3. All stamens attached to corolla at same level, or if at different levels, then the leaves not both opposite and entire.....5
4. Plants annual; upper leaves usually alternate.....Microsteris
4. Plants perennial; leaves mostly opposite or densely crowded on stem.....Phlox
5. Leaves sessile, palmately divided to near base.....6
5. Leaves not both sessile and palmately cleft to near the base.....Gilia
6. Plants annual.....Linanthus
6. Plants perennial.....7
7. Plants woody nearly throughout or else matted; leaves prickly.....Leptodactylon
7. Plants woody only at base, not matted; leaves soft or not especially prickly.....Linanthastrum

Collomia Nutt. Collomia

Plants of this genus are annuals or perennials with funnel-shaped or tubular corollas with the throats that abruptly flare into an expanded limb.

1. Plants perennial with often sprawling stems; often on high elevation talus slopes.....(3) C. debilis
1. Plants annual, often single stemmed and erect; infrequent at high elevations.....2
2. Corolla usually salmon or yellowish and >20 mm long, lobes 5-10 mm.....(2) C. grandiflora
2. Corolla usually pink, lavender, blue, or white and 4-15 mm long, lobes 1-3 mm.....(1) C. linearis

Group I. These are slender annual species.

1. Collomia linearis Nutt.

Narrow-leaf Collomia

The simple or branched stems of narrow-leaf collomia are up to 40 cm (16 in) tall and finely short-hairy on the lower portions and long-hairy, glandular, or even sticky on the upper parts. The alternate leaves are linear-elliptical to lance-shaped, and sessile. The main stem and each of the branches terminate in a dense, leafy-bracteate cluster of mostly sessile flowers with pink, bluish or white, slender and short-lobed corollas.

This is our most common and widespread species, growing in open or partly shaded, dry, lower elevation habitats. From B.C. south to CA, east to Ont. WI, NE, and NM.

2. Collomia grandiflora Dougl.

Large-flowered Collomia

This annual is very similar to C. linearis but is more robust and up to 60 cm (24 in) tall. Flowers are larger and cream- to apricot-colored or yellow.

Large-flowered collomia is found on dry, open or slightly shaded, mostly gravelly or rocky sites. It has been collected on slides and roadcuts above Painted Rock Reservoir. From B.C. south to CA and AZ and east to W. MT and W. WY.

Group II. These are our perennial collomias.

3. *Collomia debilis* (Wats.) Greene

Alpine Collomia

The deep-seated taproot of alpine collomia gives rise to low-growing, simple to branched and sprawling stems that ascend at the tip and form a mat 5-25 cm (2-10 in) across. The leaves, mostly crowded near stem tips, are about 3 cm (1.2 in) long, spatula-shaped and entire to palmately lobed. Sessile flowers are usually blue but also pink or whitish and clustered at the branch ends. The showy corollas are 15-35 mm long with a funnel-shaped tube that is much longer than the lobes.

Var. *debilis* (Wats.) Greene is an alpine plant, that is smaller, except for the consistently blue-colored flowers, than the more common var. *camporum* Pays. The latter occurs on rockslides at lower elevations such as the mountains between the East and West forks of the Bitterroot River. The shorter, broader leaves of variety *debilis* are rarely 2-3 lobed as are those of *camporum*. The alpine variety has been collected above Chaffin Lakes Basin and on West Como Peak. From WA east to W. MT, W. WY, and central UT and south to N. CA.

Gilia R. & P. *Gilia*

This genus is closely related to *Collomia*, having a long funnel-shape or tubular corolla with flaring lobes. Leaves are basal or alternate and mostly pinnately and finely dissected.

1. Corolla relatively very long, undivided portion 15-35 mm, often partly or wholly bright red.....(1) *G. aggregata*
1. Corolla smaller, length of undivided portion 10 mm or less, never bright red.....2
2. Flowers arranged in one or more very dense, rounded, head-like clusters.....(2) *G. spicata*
2. Flowers scattered in a more or less open inflorescence.....(3) *G. tenerrima*

1. *Gilia aggregata* (Pursh) Spreng.

Scarlet Gilia, Skyrocket

[*Ipomopsis aggregata* (Pursh) Grant]

In its first year this attractive and highly variable biennial develops a dark green rosette of finely pinnately dissected leaves. Foliage is glabrous or densely hairy. The second year it produces a long, sturdy stalk with palmately, pinnately, or undissected leaves that are gradually reduced toward the stem tip. Bright red, tubular flowers are borne in aggregations in the axils of upper leaves.

Scarlet gilia blooms for many weeks but quickly wilts and grows malodorous when picked. It is a frequent destination of hummingbirds in search of nectar. It is sometimes found in large colonies, on dry, open, or thinly wooded slopes all around the Bitterroot and Missoula Valleys. Scarlet gilia is also common on rockslides and sandy or gravelly banks and islands of the Clark Fork and Bitterroot rivers. From OR to CA and east to W. ND, W. NE, and CO.

2. *Gilia spicata* Nutt.

Spiked Gilia

[*Ipomopsis spicata* (Nutt.) Grant]

Spiked gilia is a taprooted, short-lived perennial with solitary to several, erect stems up to 25 cm (10 in) tall, from a branched caudex. Plants are beset throughout with matted, intertangled hairs. Leaves are 3-parted to pinnately divided. Milk-white flowers are borne in few-flowered aggregations in the axils of upper stem leaves and a terminal globe-like cluster of many flowers.

Our var. *orchidacea* (Brand) Cronq. occurs on several of the higher grassy balds on both sides of the Bitterroot River and also on Maclay Mountain southwest of Lolo. From central ID east to SD, KS, UT, and CO.

3. *Gilia tenerrima* Gray

Delicate Gilia

This is a delicate, highly-branched and mostly diminutive annual up to 10 cm (4 in) tall. The foliage is abundantly covered with stalked, glandular hairs. All the leaves are entire; those of the small rosette are inversely lance-shaped, while those of the stem are more linear and up to 4 mm by 20 mm. They are progressively reduced upward to where they are mere bracts. The minute flowers, 1-3 mm long, are solitary and terminal but because of the branching pattern appear to be scattered along the stems.

This species has been collected only a few times on dry sites on the lower slopes of the Bitterroot Mountains. Northeast OR, central ID and W. MT.



e. *Plantago aristata* f. *Collomia linearis* g. *C. grandiflora* h. *C. debilis* i. *Gilia aggregata* j. *G. spicata*
k. *Gilia tenerrima*

Leptodactylon H. & A. LeptodactylonLeptodactylon pungens (Torr.) Nutt.

Prickly Phlox

This semi-evergreen, compact, and low-growing shrub, up to 50 cm (20 in) tall, has several to many branching and densely leafy stems. Its distinctive prickly quality is due to the sessile, alternate and palmately divided leaves. The tips of each of the 3-7, stiff segments are set with a minute spine. The leaves usually persist for 1-several years. White or yellowish flowers have a long corolla tube with rounded lobes and a phlox-like fragrance. They are solitary in the axils of upper leaves.

This shrub is sporadically distributed on the dry, open foothills of the Sapphire Range and south of Horse Creek Pass on the Bitterroot-Selway Divide at elevations up to 2440 m (8,000 ft). From east of the Cascades in WA and adjacent s. B.C. to Baja Cal., east to MT, NE, and NM.

Linanthastrum Ewan. LinanthastrumLinanthastrum nuttallii (Gray) Ewan.Linanthastrum[Linanthus nuttallii (Gray) Greene]

The tufted and strongly taprooted perennial has a woody base and many slender stems up to 25 cm (10 in) high. The leaves, opposite below and alternate above, are deeply cleft into 5-9 linear, minutely spine-tipped segments, like those of Leptodactylon, but less rigid. The creamy white, strongly sweet-smelling flowers have corollas with long slender tubes that flare into short lobes. They are borne in leafy-bracteate, compact and terminal clusters.

The northernmost known occurrence of this plant is the south ridge above Kootenai Creek at an elevation of 1740 m (5,700 ft). The most extensive populations have been found near timberline on Mount Jerusalem, south-facing slopes, rockslides, and talus between 2285 and 2410 m (7,500 to 7,900 ft). It has also been recorded from the Sapphire Range between Skalkaho and Rye Creeks at elevations from 1980 to 2380 m (6,500 to 7,800 ft). From WA south to s. CA, east to central ID, W. WY, CO, and NM.

Linanthus Benth. LinanthusLinanthus septentrionalis Mason

Northern Linanthus

This is a slender-stemmed, many-branched, delicate annual up to 25 cm (10 in) tall. The leaves are cleft into several, soft and linear segments, (much like those of Linanthastrum and Leptodactylon but not spine-tipped). The white to light blue tubular-shaped corolla, 2.5-6 mm long, is longer than the calyx and flares into a wide limb, the lobes of which are often longer than the tube.

Northern linanthus is common on dry, open sites such as dry meadows but including rockslides or the lee of rock outcrops from the foothills to the high subalpine zone. This plant has been found on Castle Rock at 2350 m (7,700 ft) or the Como Peaks Ridge above Kerlee Lake at 2250 m (7,400 ft). It occurs completely east of the Cascades, from s. B.C. to CA, east to Alta., WY, and CO.

Microsteris Greene MicrosterisMicrosteris gracilis (Hook.) Greene

Pink Microsteris

Pink microsteris is an annual with a simple to highly branched stem to 25 cm (10 in) tall. The linear to elliptical-linear leaves are sessile. The lower ones are opposite, while the upper are alternate. The mostly paired (or solitary) flowers are arranged on unequal-length stalks at the stem tips. The corolla tube is white or yellowish and flares into lobes that are white, pink, or lavender.

A very common and enormously variable species, best recognized in the field by its long, narrow, and sticky calyx. Most of our populations are var. gracilis, but var. humilior (Hook.) Cronq., with spreading branches, is also present. It is found in a variety of mostly open, lowland to foothill habitats. It is widespread in western North America.

Phlox L. Phlox

All of our native phlox are somewhat sweet-scented and have corollas that are distinctly tubular and expanded at the top into a limb (ring of petal lobes), similar to the horticultural varieties. Our native Phlox spp. are dwarfed and mostly woody at the base. The leaves are narrow, sessile, and opposite.

This is a very difficult genus with many species that can only be distinguished with use of a hand lens.

POLEMONIACEAE

1. Larger leaves mostly longer than 25 mm; stalked flowers 2 to several per stem.....(1) P. longifolia
1. Larger leaves usually shorter than 25 mm; flowers solitary, sessile or short stalked.....2
2. Leaves so densely crowded and appressed to stem as to obscure it; mostly 1-5(7) mm long, narrowly lance-shaped and covered with dense woolly hairs at least at the base.....(5) P. muscoides
2. Leaves not as described above.....3
3. Leaves mostly 3-10(13) mm long and averaging about 0.5 mm wide near middle, stiff and sharp pointed, often loosely pubescent; usually mat-forming.....(4) P. hoodii
3. Leaves mostly longer than 10 mm and wider than 0.5 mm or not very stiff, pubescent or not; mat-forming or not.....4
4. Plants densely matted, 5-15 cm (2-6 in) or less high; leaves 16 mm or less long; calyx and pedicels usually glandular.....(2) P. caespitosa
4. Plants either more compact and mat-forming or, if looser and suberect, then with the leaves distinctly longer, or wider, or softer than those of #5.....5
5. Styles 1-5 mm long; leaves fairly firm and <15 mm long with thickened, but not whitish margins.....(7) P. pulvinata
5. Style length mostly 5-12 mm or possibly only 4 mm but then plants not having the above combination of qualities.....6
6. Leaves either succulent, or obviously hairy (and often glandular) or both, the larger ones generally 10-25 mm.....(6) P. kelseyi
6. Leaves neither succulent nor hairy, except possibly along their basal margins, mostly <10 mm long.....(3) P. diffusa

1. Phlox longifolia Nutt.

Long-leaf Phlox

In gross aspect long-leaf phlox is distinct from our other five species by having erect stems, to 35 cm (14 in) tall, with well-developed internodes. This smooth to strongly glandular or hairy perennial arises from a taproot but also from creeping, underground stems. Leaves are 1-2.5 mm wide by 15-80 mm long. The white or pink flowers are large, the tubes 10-18 mm long.

Long-leaf phlox is a common species of dry grasslands to open stands of ponderosa pine, occurring here from river valley benchlands to open ridges, often in the small remnants of the presettlement vegetation. From s. B.C. to s. CA, east to w. MT, w. WY, CO, and NM.

2. Phlox caespitosa Nutt.

Tufted or Clumped Phlox

Resembling a small Leptodactylon plant, tufted phlox is a subshrub, up to 15 cm (6 in) tall, with numerous, loosely erect to ascending and often glandular to glandular-hairy branches. The linear and stiff leaves, 5-13 mm long, have an inconspicuously hairy margin and a notably sharp tip. The solitary, white flowers are sessile at stem tips.

Tufted phlox has a scattered distribution in the grasslands west of Missoula (Grass Valley) and in the open ponderosa pine stands of the hills to the valley's north. A large disjunct population is known along the Nez Perce Fork of the Bitterroot River. From s. B.C. to e. WA, n. ID, and adjacent nw. MT.

3. Phlox diffusa Benth.

Spreading Phlox

Spreading phlox is our only tufted or mat-forming phlox with hairless, green leaves. They are linear, 5-20 mm wide and 0.5-2 mm long. The solitary and sessile flowers are slightly blue-tinged to light blue or lavender (rarely white).

Our var. longistylis (Wherry) Peck, is distributed throughout the Bitterroot Mountains and on the north slopes of the Continental Divide in Ravalli County. It has also been reported for the Sapphire Range. Its lowest reported elevation is 1300 m (4,300 ft) near Lolo Hot Springs where it flowers in May, shortly following snowpack recession. It is found from the lower subalpine forests to much above upper timberline, where it is a plant of north- and east-facing slopes, depressions, and areas with late melting snowpacks. It is particularly associated with open stands of alpine larch and whitebark pine. Only rarely does it occur on the fellfields and dry exposures inhabited by Phlox pulvinata. Widespread west of the Continental Divide.

4. Phlox hoodii Rich.

Hood's Phlox

Hood's phlox forms carpets of dense cushion-like stems less than 5 cm (2 in) high. The needle-like, sharp-tipped leaves are up to 10 mm long and so densely set with long, intertangled hairs that the foliage appears gray, not green. The base of each pair forms a hair-fringed collar around the stem. In our area the flowers are almost invariably white to light blue.

It is common on open and dry lower elevation sites, such as sagebrush-dominated flats. It does not occur in the Bitterroot Mountains proper but was found in a few locations north and above the Lolo Creek Valley. It also occurs intermittently in the Sapphire Range foothills southward from Miller Creek. From



l. *Leptodactylon pungens* m. *Linanthastrum nuttali* n. *Linanthus septentrionalis* o. *Microsteris gracilis*
p. *Phlox longifolia* q. *P. caespitosa* r. *P. diffusa*

POLEMONIACEAE

east of the Continental Divide in CO north to Yuk. and AK and west through WY to s. ID and occasionally central ID, n. UT, e. OR, and central WA.

5. Phlox muscoides Nutt.
[P. bryoides Nutt.]

Moss Phlox

Moss phlox forms small cushions with leaves that are densely covered with long woolly or short straight hair. The narrowly triangular and stiff leaves are short (2-4 mm), somewhat white-margined, and so numerous and closely appressed as to conceal the shoots. Flowers are white with the tube 5-10 mm long.

This phlox is locally common in open grasslands or shrublands of the Sapphire Range. From w. NE and adjacent CO and WY west to e. ID and sw. MT.

6. Phlox kelseyi Britt.
[P. missoulensis Wherry]

Missoula Phlox, Kelsey's Phlox

This taprooted, tufted perennial has numerous loosely clustered stems, up to 10 cm (4 in) long, that are almost erect to nearly prostrate. On the average this species is larger and less compact and with longer leaves than the similar P. pulvinata. Leaves are 10-25 mm long with thickened margins and are smooth to hairy or glandular. Flowers are white to light blue with flattened calyx lobes.

Our var. missoulensis (Wherry) Cronq., Missoula phlox, occurs north and east of Missoula. Large colonies are known from dry, sometimes rocky, exposures on Waterworks Hill and Mount Jumbo and Dean Stone Mountain. Granite, Powell, Missoula and Meagher counties, MT to central CO and Custer and Caribou counties, ID and disjunct at White Pine County, NV.

7. Phlox pulvinata (Wherry) Cronq.

Cushion Phlox

Cushion phlox has mostly white, sometimes blue-tinged flowers and dull green-grayish foliage. It differs from the above species by having shorter (5-12 mm) and more crowded leaves and a more diminutive, compact, mat-forming habit.

In our area this is a species of high elevations, generally fellfields or dry south- and west-facing exposures at or above timberline. It occurs on most peaks in the Bitterroot Mountains that support alpine vegetation. From sw. MT sporadically northeast to Judith Basin County and south to n. NM and UT and west to parts of OR and NV; Siberia.

Polemonium L. Polemonium, Jacob's Ladder

Our representatives of this genus include 1 unique, small white flowering annual and 3 blue-flowered perennial species with funnel-shaped corollas and alternate compound leaves. All are malodorous to various degrees.

1. Plant annual; corolla shorter than or equalling calyx.....(1) P. micranthum
1. Plants perennial; corolla longer than calyx.....2
2. Leaflets crowded on stem and so deeply 2-5 cleft as to appear whorled; corolla longer than wide and the lobes definitely shorter than the tube.....(4) P. viscosum
2. Leaflets not crowded and usually not lobed; corolla about as wide as long or wider and the lobes about as long as tube or longer.....3
3. Stems erect, 40-90 cm tall, and solitary from upturned end of short and simple rhizome.....(2) P. occidentale
3. Stems lax, mostly <30 cm tall and clustered from a branched caudex atop a taproot..(3) P. pulcherrimum

1. Polemonium micranthum Benth.

Littlebells or Annual Polemonium

Littlebells polemonium, our only annual species, is slender and taprooted with simple or branched, ascending to nearly prostrate stems. It is glandular and hairy throughout. Pinnately compound leaves have 7-15, elliptical leaflets, 1-4 mm wide and 2-9 mm long. The small white flowers are 2-5 mm long and terminal and solitary on short stems that elongate at maturity. Petals are never longer than the sepals.

The plant is commonly found in the valleys and lower foothills on waste areas or sites that are open, dry or wet in the spring but dry by mid-summer. Chiefly east of the Cascades, from s. B.C. south to CA, w. MT, and UT; South America.

2. Polemonium occidentale Greene

Western Polemonium

Western polemonium is a sturdy perennial with solitary stems, 25-100 cm (10-40 in) tall. Basal and lower stem leaves are well-developed with long petioles. The 11-27 leaflets, 10-40 mm long, are lance-shaped to elliptical and taper to a pointed tip. The deep blue or violet flowers have yellow or orange anthers. They are crowded into a mostly elongated and softly hairy inflorescence.

This species is associated with moist to wet sites, growing most commonly in the shade of valley and montane riparian shrubs such as willows and red ozier dogwood. It occurs less commonly in open, montane,



s. *Phlox hoodii* t. *P. pulvinata* u. *P. kelseyi* v. *P. muscoides* w. *Polemonium micranthum*
 x. *P. occidentale*

POLYGONACEAE

wet meadows and in the subalpine zone. Occurs almost exclusively east of the Cascades from Alta. and B.C. south to CA and CO and east to MN and possibly MI.

3. Polemonium pulcherrimum Hook.

Skunk-leaved or Showy Polemonium

Showy polemonium has several nearly erect, clustered stems 5-30 cm (2-12 in) tall. It is strongly glandular and long-hairy in the inflorescence and less so over the rest of the plant. Basal leaves are tufted and well developed, while those of the stem are reduced. The 11-25 elliptical to lance-shaped leaflets are opposite to slightly offset. Flowers with blue, bell-shaped corollas are congested in a short, somewhat flat-topped inflorescence.

Var. pulcherrimum is the smaller and more compact plant with a distinct taproot and short, roundish leaflets. Flowers are smaller and more vividly blue or violet than those of other varieties. Variety pulcherrimum is common north and west of Missoula and occurs scattered on dry and exposed sites in the foothills on both sides of the Bitterroot Valley. In the Bitterroot Mountains, a distinctly different variety, calycinum (Eastw.) Brand, is distributed from the lower slopes to near timberline. It has slender rootstocks and stems that are more drooping, with leaflets that are fewer and larger. The 3 terminal leaflets are joined at their bases, and flowers are larger and mostly pale blue. Its habitat is seasonally dry but more mesic than those inhabited by var. pulcherrimum. It is sometimes found in late-melting snowdrift areas at elevations exceeding 2700 m (8,900 ft). From AK, south to CA and CO.

4. Polemonium viscosum Nutt.

Sky Pilot, Skunkweed, Sticky Polemonium

Sky pilot is a compact, taprooted, densely glandular-hairy and sticky perennial with a strong skunk-like smell to the crushed foliage. Plants are mostly 10-15 cm (4-6 in) high. Leaves are mostly basal and up to 15 cm (6 in) long. The short petioles have an expanded and persistent base, and the leaflets are numerous, crowded, and 2-5 times cleft to the base. The blue flowers, the largest and most beautiful of all polemoniums, are densely aggregated in a hemispheric cluster.

Sky pilot is strictly an alpine species found in dry, exposed habitats mostly above 2750 m (9,000 ft). In the Bitterroot Mountains it ranges from St. Joseph Peak in the north to Mount Jerusalem in the south. It is often associated with Hulsea algida. In the Rocky Mountains from n. NM to sw. Alta., west to WA, OR (east of the Cascades), and NV.

POLYGONACEAE Buckwheat Family

The buckwheat family includes perennial and annual, erect or twining herbs as well as small shrubs or subshrubs. Leaves are alternate, opposite, or whorled, their blades simple and mostly entire. The leaf petioles are subtended by papery, stem-sheathing stipules. Flowers are mostly bisexual and consist of 4-6 undifferentiated sepals and petals (tepals). There are 4-9 stamens inserted at the base of the calyx. Fruit is a 3-angled, often flattened achene (small, 1-seeded, 1-celled fruit).

- 1 Well-developed, generally membranous stipules sheathing stems above each node; flowers not borne immediately above a whorl of bracts.....2
1. Plants lacking stipules; flowers 1-several in bell- to tube-shaped involucre composed of 3-10 bracts fused to various degrees.....Eriogonum
2. Leaf blades kidney-shaped; tepals 4; stamens 6; pistil composed of 2 carpels, fruit lens-shaped.....Oxyria
2. Leaf blades not kidney-shaped; tepals mostly 4; 3 carpels comprise pistil, fruit not as above.....3
3. Tepals 6, outer ones not enlarging in fruit; leaves often jointed to stipule base.....Rumex
3. Tepals mostly 5 (rarely 4 or 6), remaining similar in size; leaves jointed to stipule base...Polygonum

Eriogonum Michx. Eriogonum, Buckwheat, Wild Buckwheat

Ours are annual and perennial herbs, though some have a woody base. Leaves are predominantly basal and either whorled or alternate, with entire margins and no stipules. Flowers are mostly bisexual and subtended by a cuplike involucre. Few to many involucre are united at the base to form an inflorescence, often subtended by a whorl of leafy bracts. There are 6 tepals of various colors. Fruit is a 3-angled or winged achene.

1. Perianth narrowed and prolonged into a slender 0.5-3 mm stipe-like structure that forms an obvious joint with the stalk (pedicel) projecting from the involucre cup; bracts foliaceous or lacking.....2
1. Perianth narrows and forms joint directly with pedicel, no stipe present; bracts at base of inflorescence usually scale-like or lacking (seldom foliaceous).....4
2. Perianth exterior lacking hairs, at least below; leaf blades lacking hairs to only cobwebby on upper surface, often densely hairy below.....(3) E. umbellatum
2. Perianth exterior surface hairy, at least below; leaf blades moderately to densely hairy on both surfaces or rarely smooth above.....3

3. Perianth white or greenish-white to red or pink; two bracts subtending inflorescence; alpine and subalpine.....(6) E. pyrolifolium
3. Perianth yellow or reddish; usually 4-6 bracts subtending inflorescence; open slopes and ridges.....(2) E. flavum
4. Inflorescence open with several to many branches.....(4) E. strictum
4. Inflorescence capitate (head-shaped, globose), sparingly branched if at all.....5
5. Perianth outer surface hairy.....6
5. Perianth outer surface lacking hairs.....7
6. Perianth yellow.....(7) E. capistratum
6. Perianth white or greenish-white to red or pink.....(6) E. pyrolaefolium
7. Perianth segments not fused (free) or nearly so, mostly broadly oval to inversely egg-shaped.....(1) E. ovalifolium
7. Perianth segments united for 1/4 to 1/2 their length, mostly oblong to narrowly elliptical.....8
8. Perianth white or cream to pinkish.....(5) E. mancum
8. Perianth yellow.....(7) E. capistratum
1. Eriogonum ovalifolium Nutt. Oval-leaved Eriogonum, Cushion Buckwheat

This species forms dense mats, 30-40 cm (12-16 in) broad, from a branched root crown. Leaves are all basal and are usually so densely covered with long and tangled hair that the foliage appears white. Spatula-shaped leaves are less than 1 cm long. Petioles, when present are 1-3 times as long as the oval or lance-shaped blades. The naked, densely hairy flowering stem is 3-20 cm (1-12 in) tall with an inflorescence of globose clusters of several involucre subtended by 3 or more lance-shaped bracts. The externally glabrous flowers are 3-4 mm long and cream-colored with a pink or purple tinge.

Var. ovalifolium occurs from the foothills to the montane zone on outcrops or exposed rocky or gravelly ridges. It may occur in large colonies such as Waterworks Hill above Missoula, where it is associated with Douglasia montana, Phlox kelseyi v. missoulensis, Cryptantha celosioides, Senecio canus and others. Var. depressum Blank. has leaves less than 15 mm long and flower stalks shorter than 10 cm (4 in). It is the greatly dwarfed alpine form of the species, common in the Bitterroot Mountains. Peculiarities in minor characters cause it to key to var. nivalis in Hitchcock and Cronquist (1973). The leaves are rotund or almost so and nearly white on both surfaces. The flowers are mostly or entirely raspberry red or occasionally creamy white. The species has a broad ecological amplitude, from sagebrush dominated arid lands to alpine ridges. B.C. south through Cascade and Olympic Ranges to s. CA, east to eastern side of Rocky Mountains from Alta. to NM.

2. Eriogonum flavum Nutt.

Yellow Buckwheat

Yellow buckwheat has a thick, woody taproot with a somewhat branched crown that gives rise to short prostrate to ascending and partially subterranean branches densely covered with withered leaf bases. Prostrate branches form thick mats that are light green to grayish due the thick tangled hair. The leaves are basally crowded and 3-7 cm (2-3 in) long. Naked flowering stems, 10-20 cm (4-8 in) tall, bear flower clusters that are bright yellow or rose-tinged, and composed of several involucre subtended by a whorl of leafy bracts.

Yellow buckwheat occurs in rocky alpine and timberline habitats but also descends to rocky subalpine sites, especially on bedrock outcrops and rocky shelves. Our plants are var. piperi (Greene) Jones. From s. B.C. to sw. Alta., south to e. WA, ne. OR, central ID and CO.

3. Eriogonum umbellatum Torr.

Sulfur Buckwheat

Sulfur buckwheat is a stoutly taprooted perennial with a freely branching crown and mostly prostrate branches that form mats to 60 cm (24 in) across. When the stems are ascending, they are up to 30 cm (12 in) tall. Leaves are mostly less than 8 cm (3 in) long, the blade constituting about half or less of the length. The lower surface is densely long-hairy and gray-white, and the upper surface is less hairy (to smooth) and green. Blade shape is highly variable (mostly lance-shaped), but petioles are always slender. At the top of the 5-30 cm (2-12 in) tall flower stalk are several leafy bracts and 6 or more stalked, funnel-shaped involucre with long drooping lobes. The sulfur-yellow or off-white (pink-tinged) flower and its stalk are hairless.

Var. subalpinum (Greene) Jones, with cream to dull yellow flowers, is the most widespread buckwheat in our area. It is common in ponderosa pine and Douglas-fir and occasionally on grassy south slopes as high as 2285 m (7,500 ft). Vigorous colonies may blanket several square feet. The sulfur-yellow var. stellatum (Benth.) Jones has compound umbels with secondary and tertiary branches also bearing bracts. Var. stellatum has been collected west of Darby. B.C. south to s. CA, east to ID and NV and the east front of the Rocky Mtn. from MT to CO.

4. Eriogonum strictum Benth.

Strict Buckwheat

Strict buckwheat has prostrate to ascending, woody and mat-forming stems up to 10 cm (4 in) long. The rather sparse leaves abruptly narrow to a slender petiole, from 1-4 times the blade length (5-25 mm long). Both surfaces are long and densely hairy, the lower surface appearing gray, while the upper surface may be green. Naked flowering stems are mostly 10-30 cm (4-12 in) tall and hairy. The bracts are reduced to linear scales. The perianth is externally smooth and colored cream, pink, or yellow.

Our form of this species, ssp. proliferum (T. & G.) Stokes var. proliferum, has been found near Painted Rocks Reservoir on south-facing cliffs and rockslides. In our area it is rare, but is more common in the Big Hole Basin. From eastern edge of the Cascades in WA south to n. CA, east to ID, MT, and n. NV.

5. Eriogonum mancum Rydb.

Imperfect Buckwheat

The numerous cushions form thick mats, sometimes 20 cm (8 in) broad, that are covered throughout with long, tangled, woolly hair. The numerous, spatula-shaped leaves are 10-15 mm long, but the egg-shaped ones are larger. Both forms are tapered to a slender petiole. Naked flowering stems are mostly 10-20 cm (4-8 in) tall. The head-shaped flower cluster, about 10 mm wide, is subtended by 3 broadly lance-shaped bracts. Involucres are bell-shaped, 2.5-3 mm long, and membranous. Flowers, 2-3 mm long, are pink-tinged and cream-colored to wholly red.

This species has been collected in the dry grass and sagebrush covered hills southeast of Victor and on the slopes of the Continental Divide south of Sula. From Granite and Powell counties, MT south to Lemhi and Clark counties, ID, often on soils derived from calcareous substrates.

6. Eriogonum pyrolaefolium Hook.

Alpine Buckwheat

This strongly taprooted perennial has a simple to branched crown producing densely leafy cushions that retain the old leaf bases. The leaves are mostly smooth and greenish-yellow on the upper surface with reddish-brown, long, tangled hair beneath. They are mostly elliptical to inversely egg-shaped. The several naked flowering stems are 5-15 cm (2-6 in) tall, and the densely clustered flowers are subtended by 2 linear bracts, 10-20 mm long. The perianth is white to greenish-white, pink, or red, and 4-5 mm long.

This buckwheat has the greatest moisture requirements. It occurs in Montana only in the Bitterroot Mountains on upper slopes or on scree or gravel slides, often downslope from late-melting snowbanks or in minor depressions, areas likely to be moist well into the growing season. It is typically associated with Chionophila tweedyi, Luzula hitchcockii, Carex paysonis, Spraguea spp., Saxifraga tolmiei and Polygonum phytolaccaefolium. This species often grows beneath alpine larch, but is never associated with whitebark pine krummholz which is typically wind-exposed and dry. This is nearly the only plant on the steep and highly unstable sand and gravel slides on the upper south slopes of Lolo and St. Joseph Peaks. Our plants are var. coryphaeum T. & G. WA to CA, east to ID and W. MT.

7. Eriogonum capistratum in ed.

Golden Buckwheat

[E. chrysops Rydb. misapplied]

This perennial forms dense mats 5-15 cm (2-6 in) across and less than 10 cm high. The numerous basal leaves are spatula- to inversely lance-shaped, and 10-40 mm long, tapering gradually to a slender petiole. The naked flowering stems are smooth to short-hairy and 1-7 cm tall. Each bears a head-shaped, 10-15 mm broad inflorescence of 3-7 sessile involucres that are subtended by 3-5 membranous, lance-shaped bracts. The tepals are united for about 1/3 their length into a bell-shape. They are smooth to lightly glandular and yellow with rusty-red patches.

This is a characteristic mat-forming alpine species of the Bitterroot Mountains from Sweeney Peak south to the Castle Crags and Ward Mountain. It grows on exposed cliffs, rimrock, bedrock crevices and scree, usually on granitic parent material. Associated plants are often Selaginella densa, Arenaria obtusiloba, Festuca brachyphylla, Oryzopsis exigua, and E. ovalifolium.

According to James Reveal, our plants are var. muhlickii Reveal., endemic to southwest Montana. This plant has been confused with E. chrysops, but this latter species is known only from se. OR.

Oxyria Hill Mountain SorrelOxyria digyna (L.) Hill

Mountain Sorrel

Mountain sorrel is a hairless, red-tinged perennial with a fleshy taproot and branching crown. Leaves are almost all basal with long petioles and distinctive kidney-shaped to nearly round blades. The 1-several stems, 10-40 cm (4-16 in) tall, are leafless or nearly so. The stipules are membranous and brown or red-tinged. Greenish to red flowers are clustered on delicate stalks, several per node. Fruits are flattened, lens-shaped, and prominently winged.

This circumboreal species occurs throughout our area on open, moist sites, usually talus slopes or fellfields from the upper subalpine to, most typically, the alpine. In North America from AK to Lab., south in most of the higher mountains to s. CA, AZ, NM, and NH.



y. *Polemonium pulcherrimum* z. *P. viscosum* a. *Eriogonum ovalifolium* b. *E. flavum* c. *E. mancum*

Polygonum L. Knotweed, Smartweed

This genus includes annuals and perennials with somewhat swollen nodes and simple, entire, alternate leaves. A sheathing stipule surrounds the stem at points where the leaves are attached. The mostly bisexual flowers are borne in axillary clusters or more compact inflorescences at the stem tips. The 4-6, mostly greenish, white, or pink perianth segments (tepals) are fused at least at their bases. Commonly there are 5 (3-9) stamens and 2-3 styles. The fruit, a lens-shaped to 3-angled achene, is usually completely enclosed by persistent perianth but may be extend well beyond it.

1. Stems twining, vine-like; outer perianth lobes with keels or winged; leaves arrowhead-shaped.....(19) P. convolvulus
1. Stem not vine-like or twining; outer perianth lobes not keeled or winged; leaves not arrowhead-shaped but rather mostly linear, oblong-elliptical.....2
2. Plants annual, generally with a small taproot and lacking nodally rooting branches, mostly in dry areas but sometimes on wet soil.....13
2. Plants perennial, often rhizomatous; generally growing in or near water; stems often freely rooting.....3
3. Flowers in a terminal head or spike-like raceme on a leafless or few-leaved or bracteate stem; plants with short, thick rhizomes; leaves mostly basal.....4
3. Flowers in axillary or terminal inflorescences of leafy stems; plants various.....5
4. Inflorescences mostly <15 mm broad when pressed and length usually much >3 times width; lower flower generally replaced by small bulbs; plant 10-30 cm (4-12 in).....(21) P. viviparum
4. Inflorescences mostly >15 mm broad when pressed and rarely is length >2.5 times the width; small bulbs lacking; plant from 10-70 cm (4-28 in).....(20) P. bistortoides
5. Plants with erect annual stems often >1 m (40 in); strongly rhizomatous; leaves heart-shaped to broadly lance-shaped and usually much >60 mm broad; not of alpine or subalpine.....(23) P. sawatchense
5. Plants generally decumbent; annual stems usually much <1 m (40 in) long; leaf shape various and width almost always <60 mm; plants often of alpine or subalpine zones.....6
6. Plants subalpine to alpine with enlarged mostly fleshy crowns or rootstocks; leaves numerous, all of stem and alike; scarcely reduced upward; stems freely branched and erect.....(22) P. phytolaccaefolium
6. Plants of various habitats, if subalpine or alpine then aquatic; leaves various; stems unbranched and often floating or decumbent; stems generally unbranched.....7
7. Flowers rose-colored borne in 1-2 terminal or subterminal spikelike inflorescence; styles 2-4 mm long; perianth not glandular.....8
7. Flowers white, greenish-white, or pink and borne in several to many compound racemes; styles mostly <2 mm; perianth sometimes glandular.....9
8. Flower stalks usually glandular-hairy; inflorescence at least 40 mm long and cylindrical; wet sites with plants usually only partially submerged.....(15) P. coccineum
8. Flower stalks generally lacking hairs; flower clusters egg- to cone-shaped and mostly <40 mm long; plants aquatic to semi-aquatic (submerged or floating).....(14) P. amphibium
9. Perianth with numerous stalkless, clear glands set in pits on exposed surface.....10
9. Perianth lacking stalkless clear glands in its outward-facing surface.....11
10. Seeds brownish-black to black, shining, smooth; perianth 5-lobed; stamens usually 8..(13) P. punctatum
10. Seeds brown, glandular and dull; perianth mostly 4-lobed; stamens mostly 6.....(9) P. hydropiper
11. Flowers arranged in spike-like and generally paired inflorescences (flowers sessile) longer than 30 mm; plants obviously perennial.....(10) P. hydropiperoides
11. Flowers arranged in many short, thick, mostly continuous inflorescences <30 mm long; plants generally annual, or simulating a perennial.....12
12. Nerves on outer pair of perianth parts prominent with veins branched and recurved at tip; stipules mostly lacking bristles on margins; leaf blade lacking spot(s).....(11) P. lapathifolium
12. Nerves on outer perianth parts not prominent, or recurved at tip; stipules mostly very bristly on sides; leaf blade purple-spotted near center.....(12) P. persicaria
13. Stipules forming a sheath, oblique to truncate but not lobed at top and not irregularly cut or cleft; plants mostly 30-100 cm (12-40 in) tall.....10
13. Stipules sheathing at first but generally strongly 2-lobed above and becoming irregularly cut or cleft and often recurved; plants sometimes <30 cm (12 in) tall.....14

14. Individual flower stalks becoming sharply recurved, the older flowers reflexed; plants spreading to erect; inflorescences elongated with the flowers not crowded and axillary to much-reduced bracts....15
14. Flower stalks erect or spreading, not sharply reflexed; plants sometimes prostrate; flowers often much crowded in short terminal inflorescences and mostly much shorter than the bracts.....16
15. Perianth mostly 4-5 mm long; leaves linear to oblong, 2-5 cm (1-2 in) and barely 1/6 as broad.....(5) P. majus
15. Perianth mostly <3.5 mm long; leaves various but often 1/6 as broad as long.....(6) P. douglasii
16. Flowers crowded and overlapping in terminal spike-like inflorescences, often much shorter than the subtending bracts.....17
16. Flowers borne mainly in the leaf axils and seldom crowded, the upper ones often axillary to and longer than the reduced bracts.....19
17. Fertile stamens numbering 8; bracts of flower clusters not white-margined and mostly 2-3 times as long as flowers; plant 20-80 mm tall.....(17) P. watsonii
17. Fertile stamens usually only 3; bracts of inflorescence white-margined and 4-6 times longer than flowers....8
18. Flower bracts plainly white-margined and the upper ones often not longer than the flowers; plants often >70 mm tall.....(18) P. confertiflorum
18. Flower bracts with barely perceptible white-margins and the upper ones usually longer than the flowers; plant height mostly <70 mm.....(16) P. kelloggii
19. Seeds black, smooth and shining; perianth parts fused for 1/3-1/4 their length and not yellow-margin.....20
19. Seeds mostly yellow-green to brown, slightly roughened and dull; if seeds black then perianth parts fused for >1/3 or parts yellow-margined.....21
20. Plants generally erect; leaves seldom >2 times as long as broad and barely reduced upward thus concealing the flowers.....(8) P. minimum
20. Plants usually spreading at the base; leaves mostly much >2 times as long as broad and much reduced upward and not concealing upper flowers.....(4) P. sawatchense
21. Tepals yellow-margined, outer 3 strongly hood-shaped and longer and broader than inner 2.....22
21. Tepals green, white- or pink-margined, the outer 3 mostly not hooded nor broader or longer than the inner 2.....23
22. Leaves linear to narrowly oblong, 20-60 mm long, at least 5 times longer than broad, their size is gradually reduced upward; floral leaves scarcely exceeding flowers.....(7) P. ramosissimum
22. Leaves oblong or elliptical to egg-shaped, 2-4 times longer than broad, slightly reduced upward; floral leaves greatly exceeding flowers.....(3) P. erectum
23. Outer 3 tepals hooded or keeled and longer and broader than the inner 2; leaves oval to inversely egg-shaped, with rounded tips.....(1) P. achoreum
23. Outer tepals mostly not hooded or keeled and about same size as inner 2; leaves linear to lance-shaped or inversely lance-shaped, often with sharp pointed tips.....(2) P. aviculare

Group I. This assemblage includes annual plants with short stems that branch near the base to produce prostrate, ascending, or even erect branches. Leaves are small, sessile to short-petiolate, oval to linear, round- to pointed-tipped, gradually decreasing in size toward stem tips. The inconspicuous flowers are 1-4 per leaf axil or in elongated, bracteate spikes. Several of the species intergrade and are difficult to distinguish.

1. Polygonum achoreum Blake

Knotweed

This bluish-green annual has striated, freely branched, prostrate to ascending stems 10-40 cm (4-16 in) long. The crowded and somewhat overlapping leaves are 10-25 mm long, egg-shaped, and round at the apex. Stipules have jagged edges. The 1-3 flowers are born in axils of barely reduced leaves or bracts. The 5-lobed perianth is fused about 1/2 its length and is greenish with narrow, white margins.

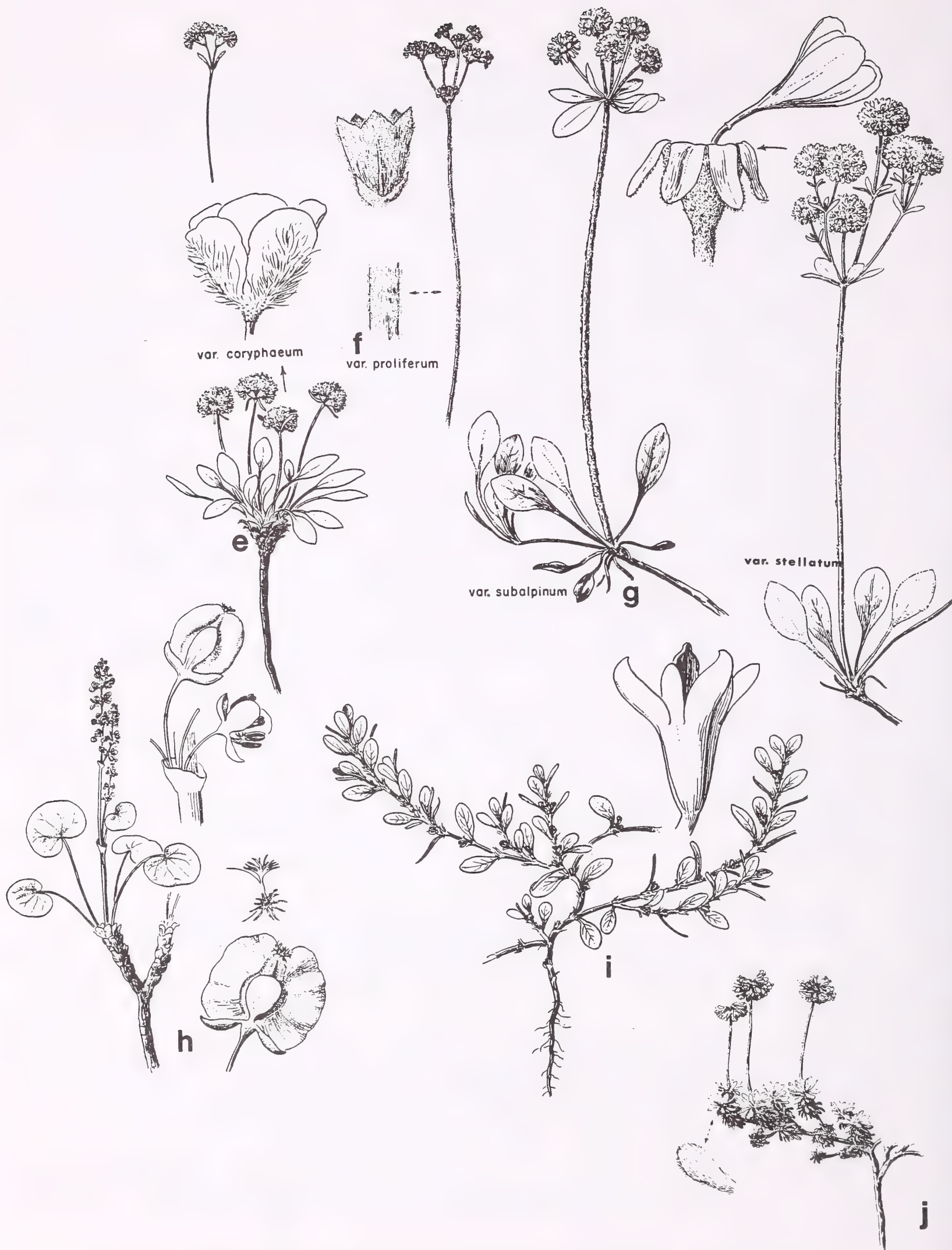
Knotweed is a very common weed of dry, often compacted or waste sites, such as untended areas between buildings. From MT and ID and e. OR to CO and east in Can. and n. U.S. to Que. and NY.

2. Polygonum aviculare L.

Doorweed, Dooryard Knotweed

This knotweed is more slender than P. achoreum because of its longer, lax stems and more elongated leaves 10-30 mm wide by 2-6 mm broad. Stems are lined, and the leaves are blue-green as in the above species.

This is a cosmopolitan weed occupying virtually the same habitats as P. achoreum.



e. *Eriogonum pyrolaeifolium* f. *E. strictum* g. *E. umbellatum* h. *Oxyria digyna* i. *Polygonum achoreum*
 ii. *Eriogonum capistratum*

3. Polygonum erectum L.

Erect Knotweed

This is a highly branched, spreading to erect annual with leaves little reduced upward and sufficiently dense to hide the flowers. Leaf size and shape are like those of P. achoreum, but their color is yellowish-green. The tepals, ca. 3 mm long, are united only on the basal 1/3.

Erect knotweed occurs in habitats much like those of the former 2 species. Mostly a weed of e. Can. and ne. U.S. and west to MN and MO and sporadically to the Pacific Coast.

4. Polygonum sawatchense Small

Sawatch Knotweed

Sawatch knotweed is a sparingly branched, erect annual, 5-25 cm (2-10 in) tall, with roughened, 4-angled stems. The leaves are broadly elliptical, to lance- or inversely lance-shaped. Leaf size becomes progressively reduced up the stem. The 1-4 flowers are borne in the leaf axils for nearly the full length of the stem.

This species is typically found on dry to moist flats and slopes, mostly in the foothills. From the Cascades of n. WA to CA and east to ND and CO.

5. Polygonum majus (Meisn.) Piper

Palouse Knotweed

Palouse knotweed has erect stems, 10-30 cm (4-12 in) tall, with simple or divided, strongly angled, and ascending branches. The numerous linear leaves, 20-50 mm long, are gradually reduced upwards. Flowers are mostly paired in the axils of highly reduced bracts in somewhat elongated inflorescences.

This is an uncommon plant found in ponderosa pine forests of the foothills and open slopes. From east slopes of the s. B.C. Cascades south to n. CA and east to ID and MT.

6. Polygonum douglasii Greene

Douglas' knotweed, mountain Knotweed

Douglas' knotweed is very similar to P. majus, but the stem is not evidently angled, and the leaves are less linear, more oblong or lance-shaped, and the perianth is smaller.

Locally very common in the foothills of the Bitterroot Mountains, usually on barren and exposed slopes. Widely distributed in North America but especially common in the w. U.S. and Can.

7. Polygonum ramosissimum Michx.

Bushy Knotweed

Bushy knotweed has mostly freely branched, ascending, and striated stems. It is closely related to P. aviculare but has mostly narrower and shorter leaves that are reduced upward. The leaves wither early, leaving the stem naked at flowering time. The stipules, 5-12 mm long, sometimes enclose the axillary flowers, but not the terminal ones.

Uncommon species in our area, growing on dry or moist substrates. It is more common east of the Continental Divide. From e. WA and OR to CA, east to the Atlantic Coast.

8. Polygonum minimum Wats.

Leafy Dwarf Knotweed

In our area, leafy dwarf knotweed is mostly less than 5 cm (2 in) tall with basally branched, slightly angled, and densely leafy stems. The egg-shaped to oblong-elliptical leaves, 5-15 mm long, are slightly reduced and more crowded up the stem. They conceal the small flowers that are borne 1-4 in almost every axil.

This diminutive species is common in the Bitterroot Mountains throughout the subalpine zone up to timberlines. It occurs on open sites with moss or very shallow mineral soil. From the Cascades of B.C. south to south end of Sierra Nevada, east to Rocky Mountains from Alta. to CO.

Group II. This assemblage includes coarse, often tall and weedy annual or perennial herbs of moist to wet sites such as irrigated fields, ditches, ponds, and swamps. Stems are erect or sometimes prostrate at the base and rooting at the nodes. Leaves are short-petioled to sessile and narrowly to broadly lance-shaped. Flowers are arranged in elongated, spikelike inflorescences.

9. Polygonum hydropiper L.

Marshpepper Smartweed

The freely branched annual or sometimes perennial herb has reddish stems with sessile glands. It tends to root at the nodes. The numerous leaves are 5-7 cm (2-3 in) long and slightly reduced upwards, approaching sessile toward the top. Narrow, spikelike inflorescences are both terminal and axillary with some of the flowers hidden by the stem sheaths that are formed by highly-modified stipules.

This weed is common in the shallow waters of Bitterroot River sloughs. European in origin, this species is common throughout North America.

10. Polygonum hydropiperoides Michx.

Waterpepper Smartweed

Waterpepper smartweed is much like the former species; however, it is distinctly perennial with stems to 1 m (40 in) long and stipules with short, stiff hairs and appressed, bristly hairs around the sheath opening.



j. *Polygonum aviculare* k. *P. erectum* l. *P. sawatchense* m. *P. majus* n. *P. douglasii* o. *P. ramosissimum*
 p. *Polygonum minimum*

The habitat is mostly the same as that of P. hydropiper and includes mudflats and reservoir drawdown margins, but P. hydropiperoides is more common in our area. From B.C. to Que., south to Mex. and South America.

11. Polygonum lapathifolium L.

Willow Weed, Curlytop Ladysthumb

An erect, slender, highly branched annual, it has thickened nodes and is smooth to hairy. Leaves are mostly narrowly lance-shaped and 6-15 cm (2-6 in) long. The stipules are brownish and strongly ciliate. The inflorescence is erect or slightly nodding and is composed of several many-flowered, dense, spikelike inflorescences.

A highly variable species found in heavily irrigated fields close to the main rivers. It is uncommon in the Pacific Northwest but is common to the east and south.

12. Polygonum persicaria L.

Heartweed, Spotted Ladysthumb

This species is similar to P. lapathifolium but is taller, more spreading, and most obviously set apart by purplish spots on the leaf blades. The sheaths (stipules) that encircle the stems are hairy and bear long cilia at the funnel-shaped open end.

It is also a weed associated with the intensively irrigated fields paralleling the main rivers. It is common throughout North America, usually found on moist disturbed or cultivated ground.

13. Polygonum punctatum Ell.

Dotted Smartweed

Dotted smartweed may be an annual or perennial. It has translucent stalkless glands throughout. Stems are erect to prostrate, up to 1 m (40 in) long, and root at the nodes. The numerous, stem leaves, 5-10 cm (2-4 in) long, are narrowly lance-shaped and smooth except for the stalkless glands on the surface and the marginal hairs.

From a distance dotted smartweed looks like P. hydropiper, and it prefers the same sorts of environments, lower elevation moist areas and roadside ditches. Found throughout the Pacific Northwest, it is most common west of the Cascades.

Group III. Included here are 2 closely related perennial species that occur in aquatic to terrestrial habitats. They are stout plants with stems freely rooting at the nodes. Their tips are erect and topped by a showy, bright pink flowering spike. All leaves are borne on the stem, and leaf blades are egg- to broadly lance-shaped with petioles 1/3 the length of the blade. Some authors combine the following 2 taxa into 1 species.

14. Polygonum amphibium L.

Water Smartweed, Water Ladysthumb

Water smartweed is highly variable but is usually smooth to partly hairy. The cylindrical stipule sheath has a spreading green collar. Leaves, up to 15 cm (6 in) long, are narrowly elliptical to lance-shaped and sometimes abruptly contracted at the petiole. The bright red or pink flowers, 4-5 mm long, are tightly packed into an egg- to cone-shaped, spikelike inflorescence less than 40 mm long.

Throughout its range, water smartweed is variously known as a floating aquatic and terrestrial plant of marshes or water-land ecotones. In our area it has been collected in sloughs of the Bitterroot River. This species is cosmopolitan, known from all continents except Australia.

15. Polygonum coccineum Muhl.

Water Smartweed

This species is similar to P. amphibium in vegetative characters, but the flower stalks are glandular and thickly covered with hairs, and the spikelike inflorescence, though densely set with pink or red flowers, is cylinder-shaped and 40-80 mm long.

Water smartweed and P. amphibium may hybridize producing specimens with intermediate characters. Polygonum coccineum is not as strongly associated with aquatic environments as P. amphibium but is found on moist to wet sites, such as marshes. Found throughout North America from lowlands to lower elevations in the mountains.

Group IV. This assemblage is of small annual plants, 2-15 cm (1-6 in) tall, with erect, simple or branched stems, linear or lance-shaped leaves, flowers subtended by bracts and crowded in terminal spikes and also in leaf axils. These species occur from the valley foothills to the lower subalpine zone; they are typically found in vernal pools, vernal moist mountain sites, in meadows and on south- and west-facing slopes, often on disturbed ground.

16. Polygonum kelloggii Greene

Kellogg's Knotweed

This diminutive annual, 1-7 cm tall, is simple or branched with angled stems. Stem leaves are linear, 5-25 mm long and only slightly reduced upward. The stems bear mostly paired, axillary flowers almost to the base with additional groups terminating the stems. The linear, sometimes white-margined floral bracts are 2-3 times longer than the flowers and only slightly reduced upward.

Found in vernal pools and meadows from B.C. south to n. CA, east to MT, WY, CO, and AZ.



q. *Polygonum hydropiper* r. *P. hydropiperoides* s. *P. lapathifolium* t. *P. persicaria* u. *P. punctatum*

17. Polygonum watsonii Small

Water Knotweed

Water knotweed is very similar to P. kelloggii but much less commonly collected in our area. The upper floral bracts are shorter and slightly broader than the leaves and occasionally have a narrow, white border. The lower bracts are as large as the leaves and pointed upward. Flowers are borne in dense spikelike clusters only at the stem tips.

Habitats include vernal pools and moist meadows on the east side of the Cascades from WA east to Alta., MT and WY and south to NM and CA.

18. Polygonum confertiflorum Nutt.

Close-flowered Knotweed

This is the tallest species of this group. Stems are simple or mostly branched and 4-20 cm (1-8 in) tall. The leaves and floral bracts are linear, the upper bracts much shorter and broader than the lower ones. They are evidently white-margined and sometimes shorter than the flowers. Flowers are crowded near branch ends, 2-4 per node.

This plant has been collected only once in our area, in the southwest part of Ravalli County. It occurs on dry, open slopes. East side of the Cascades, east to ID, central MT and nw. WY and south to n. CA.

Group V. This group includes 5 species that are morphologically distinct, relatively common, and easily identified.

19. Polygonum convolvulus L.

Black Bindweed

The trailing and climbing or sometimes erect stems of this annual are up to 1 m (40 in) long with widely spaced leaves. The arrowhead-shaped leaves are 3-6 cm long and borne on slender petioles just below obliquely funnel-shaped, brownish, and membranous stipules. Flowers are inconspicuous and green and borne in axillary clusters and/or loose leafless spikes. The seeds are triangular and black with slightly roughened surfaces.

This is a widespread European annual weed of gardens, fields, and waste areas and is now found throughout the n. U.S. and Can.

20. Polygonum bistortoides Pursh.

American Bistort, Snakeweed

The 1-several stems, 20-60 cm (8-24 in) tall, arise from sturdy, short rootstocks. Leaves are mainly basal with long petioles and lance-shaped to narrowly elliptical blades 7-20 cm (3-8 in) long. The few stem leaves are mostly sessile, small, and notably reduced upward. Stipules form a brownish, entire sheath. The white to pinkish flowers are densely clustered into a terminal spike.

When spring comes to the alpine zone, one can hardly look across an expanse without seeing countless white dots, the flowering heads of American bistort, swaying in the breeze. Though often abundant in the alpine, this species ranges downward to moist rangeland sites in the foothills. The plants become increasingly smaller and more pink-red with increasing elevations. Flowers always fade to white and eventually cure to a brown in late summer. From B.C. to s. CA, east to Alta., MT, and NM

21. Polygonum viviparum L.

Viviparous Bistort

The stems of this species are similar but shorter and less conspicuous than those of P. bistortoides. They arise from a short thick woody base or rhizome. Basal leaves are up to 20 cm (8 in) long, half of which is petiole, and the blades are narrowly lance-shaped. The inflorescence is narrowly cylindrical with the lower flowers replaced by small, egg-shaped bulbs and sterile pink and white flowers above.

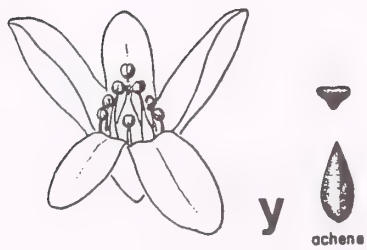
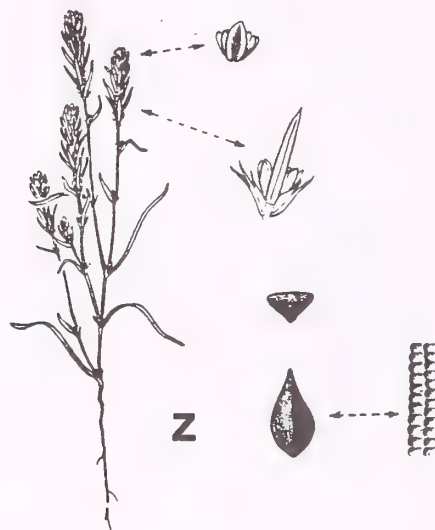
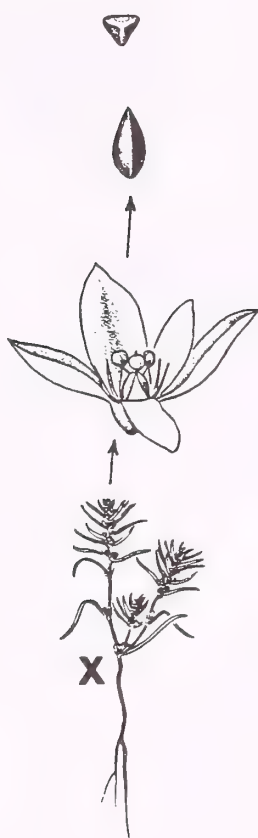
This circumboreal species is not known from the Bitterroot Mountains but has been found near Skalkaho Falls in the Sapphire Range. In general it occurs in moist meadows and streambanks up to alpine ridges. From AK to Newf. to WA Cascades and in the Rocky Mountains to NM; also in most of mountainous ID and ne. OR and across most of the northern tier of states.

22. Polygonum phytolaccaefolium Meisn.

Alpine Knotweed

Several stout, erect, simple or branched stems, 50-90 cm (20-36 in) tall, arise from a robust, branched rootcrown. This species has only stem leaves that are mostly crowded and hardly reduced upward. They are narrowly to broadly lance-shaped with short petioles. Stipules form an oblique, brownish sheath. Numerous, small, white to greenish flowers are arranged in terminal or nearly terminal, highly branched, and bracteate clusters.

Alpine knotweed is common in open subalpine and timberline areas throughout northwest Montana, including the Bitterroot Mountains. It is less common in the Sapphire Range. Sometimes it occurs in extensive populations at the edges of rockslides, often on unstable or stable, partially decomposed granite, gravel, or mature soils. In some areas of the Northern Rockies, there is evidence that these nearly pure stands of alpine knotweed are the result of excessive sheep trailing. Mountain goats have been observed consuming the upper stem leaves and seeds. Fall foliage is a distinct orange. From AK to the Sierra Nevada, east to ID, w. MT, e. OR, and w. NV.



achene



v. *Polygonum amphibium* w. *P. coccineum* x. *P. kelloggii* y. *P. watsonii* z. *P. confertiflorum*
a. *Polygonum convolvulus*

23. Polygonum sachalinense Schmidt

Giant Knotweed

This strongly rhizomatous perennial has wandlike, reddish stems up to 2 m (80 in) tall. The petiolate leaves are mostly heart-shaped, 15-30 cm (6-12 in) long, and at least 2/3 as broad. The greenish-white flowers are borne in small axillary clusters.

This species is native to Japan but cultivated here. Our single report comes from an abandoned homestead near Stevensville.

Rumex L. Dock, Sorrel

This genus consists of mostly perennial, some biennial, and one annual herb that bear unisexual flowers with both sexes on the same plant or on different plants. Plants may be taprooted, fibrous rooted, or arise from a thick rhizomelike rootstock. Stems are erect to ascending and simple or branched. Leaves are mostly basal and alternate with stipules that sheath the stem at the base of the petiole. The small flowers are mostly aggregated in large, terminal bracteate inflorescences. Fruits are winged, small, dry seeds (achenes).

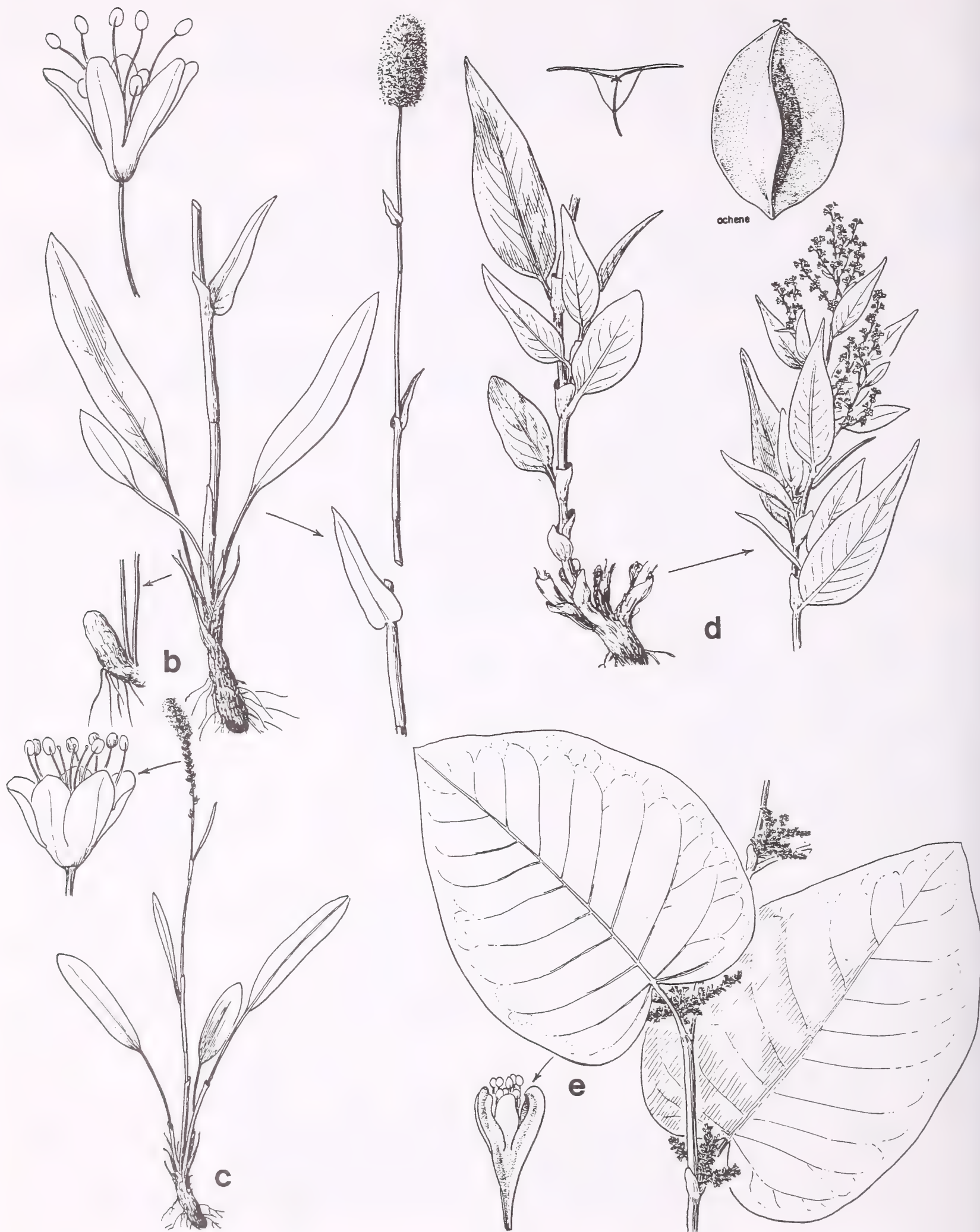
1. Flowers nearly all unisexual and female and each sex borne on separate plants; leaves arrowhead-shaped or with basal lobes directed outward or plant montane with numerous elliptical leaves.....2
1. Flowers composed of both sexes; leaves of varied shapes, but not arrowhead-shaped; plants mainly of the lowland.....3
2. Stalks of individual flowers jointed about midway; leaf blades up to 10 cm (4 in) long with lobes pointing downward.....(2) R. acetosa
2. Stalks of flowers jointed closer to flower; blade length up to 5 cm (2 in) with lobes spreading to the side.....(1) R. acetosella
3. Plants strongly rhizomatous, forming large patches; leaves generally leathery.....(8) R. venosus
3. Plants generally not rhizomatous, not forming extensive mats; leaves various.....4
4. Inner tepals with teeth 1 mm or longer or dissected, at least one of the teeth with a hard projection or raised area.....5
4. Inner tepals not serrate to slightly jagged, teeth, if any <1 mm long, and occasionally none bear a hard projection.....6
5. Plants annual, 20-70 cm (4-28 in) tall; all valves with a hardened projection; flower stalk jointed well below midlength.....(9) R. maritimus
5. Plants perennial, 40-120 cm (16-48 in) tall; some valves without projection; flower stalks jointed near midlength.....(5) R. obtusifolius
6. None of the valves of fruit having hardened projections.....7
6. All or part of valves of fruit having hardened projections.....8
7. Valves seldom >3 mm; basal and lower stem leaf blades 5-10(15) cm (2-4 in) long, mostly 5 times longer than broad and rounded at base.....(7) R. salicifolius
7. Valves mostly 3-10 mm; basal and lower leaf blades 10-30 cm long, <5 times longer than wide and some truncate to heart-shaped at the base.....(4) R. occidentalis
8. Stems unbranched below the inflorescence; petioles mostly with some degree of rough hairiness or with minute rounded projections.....9
8. Stems having axillary, often much reduced branches at some or all nodes below the inflorescence; petioles only rarely with hairs rough to the touch or with small bumps.....(7) R. salicifolius
9. Panicles (inflorescences) open, the flower whorls not contiguous; leaf margins not irregularly wavy or curled.....(6) R. sanguineus
9. Panicles dense, the flower whorls contiguous, especially towards the branch ends; leaves with strongly curled or wavy margins.....(3) R. crispus

1. Rumex acetosella L.

Sheep, Red, Cow, Mountain, Field or Horse Sorrel, Sour Weed

Sheep sorrel is a perennial with thin, erect stems, 20-30 cm (8-12 in) tall, arising from creeping rhizomes. The leaves are primarily basal and highly variable. They are mostly 2-4 cm (1-2 in) long, sometimes with triangular-shaped basal lobes that result in an arrowhead shape. The small, bright red flowers, about 1 mm long, are borne in numerous clusters in a branched inflorescence.

This weed often occurs in large colonies in acid or disturbed soils. The creeping rootstocks of this European species make it persistent and difficult to eradicate. Throughout the Northern Hemisphere, North America north of Mexico and much of the other world.



b. *Polygonum bistortoides* c. *P. viviparum* d. *P. phytolaccaefolium* e. *P. sachalinense*

2. Rumex acetosa L.

Garden, Kitchen, Green, Tall, or Meadow Sorrel

This perennial herb has one to several, stout, erect stems, 40-100 cm (16-40 in) tall, growing from a vigorous rootstock. The basal leaves have long petioles and arrowhead-shaped blades to about 10 cm (4 in) long. Blade size and petiole length are progressively reduced upwards. The bright red and slender-branched inflorescence is subtended by a few sessile, lance-shaped bracts.

In the past this Eurasian native was often cultivated as a salad green, but a few populations have escaped to become nuisances in pastures, such as those located above lower McCalla Creek southwest of Stevensville.

3. Rumex crispus L.

Curly, Sour or Yellow Dock

This coarse perennial has single, erect stems to 1 m (40 in) tall. Leaves are mostly distributed along the stem. The lower ones have a long petiole and a blade with parallel and irregularly curled sides, pointed tips, and a tapered base. The leaves are progressively reduced up the stem. The dull, rusty-brown (when mature) inflorescence is slender and up to 40 cm (16 in) long with short lateral branches in the axils of leafy bracts.

Curly dock is a common European weed of roadsides and pastures throughout our area and much of the world.

4. Rumex occidentalis Wats.

Western Dock

Western dock has stout reddish-tinged stems, to 1.8 m (72 in) tall, that are unbranched below inflorescence. It is even more robust than R. crispus. The largest leaves are 10-30 cm (4-12 in) long, with parallel sides and bases abruptly contracted to heart-shaped, smooth margins. The narrow flower clusters are up to 40 cm (16 in) long with steeply erect lateral branches.

Western dock is less common than R. crispus and occupies wetter sites. From AK to Que. and south to central CA, NV, UT, NM, and SD.

5. Rumex obtusifolius L.

Bitter, Butter, Broad-leaved or One-stemmed Dock

This perennial, like R. crispus and R. occidentalis, is taprooted, robust and tall, but it often has more numerous basal leaves covered with short, stiff hairs, making it rough to the touch. The basal leaves, 10-35 cm (4-14 in) long, are broadly oblong with heart-shaped to truncate bases and irregularly curled margins. Stem leaves are few and reduced in size up the stem. Flowers are borne in whorls, the lower ones several times further apart on the stem than the upper ones.

This weedy species of roadsides and wastelands is uncommon in our area. It has been collected only in the sw. part of Ravalli County. From s. AK to CA, mostly west of Cascades but also much of North and South America and Eurasia.

6. Rumex sanguineus L.

Red-veined Dock

Red-veined dock has erect, slender stems, 60-100 cm (24-40 in) tall. The lance-shaped leaves taper to a long point and are up to 15 cm (6 in) long. Flowers are borne in evenly spaced whorls of narrow branches subtended by leafy bracts in the open inflorescence.

Apparently this European native, sporadically introduced in North America, is frequently mistaken for R. conglomeratus. It is rare in our area, collected only on an island in the Clark Fork River.

7. Rumex salicifolius Weirm.

Narrow-leaved or Willow Dock

Willow dock is a glabrous perennial arising from a stout taproot, usually with several branched and ascending stems, to 60 cm (24 in) tall. Most leaves are on the stem the, lower ones short-petiolate and the upper ones sessile and narrowly lance-shaped. The inflorescence has leaflike bracts scattered throughout.

Willow dock is a variable native species with a broad ecological amplitude. Its distribution in our area stretches from the river valleys to the lower subalpine zone. Our plants are ssp. triangulivalvis Danser. It is virtually ubiquitous across the U.S.; Europe.

8. Rumex venosus Pursh

Veiny or Winged Dock, Wild Begonia

The veiny dock is a widely-spreading perennial with reddish-tinged stems, 15-40 cm (6-16 in) tall, arising from woody rhizomes. The sheathing stipules, 1-3 cm long, are conspicuously white. The numerous stem leaves are thick and firm textured with stout petioles and broadly lance-shaped to egg-shaped or oblong blades. The inflorescence is relatively short and wide with leafy bracts. The large, mature fruits are a deep rose and prominently veined, with heart-shaped bases.

This species is apparently rare in our area. We have only one collection from the foothills nw. of Missoula. Its usual habitat is sandy to gravelly substrates from grassland to sagebrush desert. East of the Cascades, B.C. south to ne. CA, east to Sask., ND, NE, CO, and NM.



f. *Rumex acetosella* g. *R. acetosa* h. *R. occidentalis* i. *R. crispus*



j. *Rumex obtusifolius* k. *R. sanguineus* l. *R. salicifolius*

PORTULACACEAE

9. Rumex maritimus L.

Golden Dock

This native annual or biennial has a branching stem, 5-70 cm (2-28 in) tall, and foliage that is rough to the touch. Basal leaves are few. Stem leaves are reduced upward and narrowly lance- to strap-shaped with truncate to heart-shaped bases. The inflorescence is leafy and often more than half as long as the whole plant. Flowers are arranged in dense whorls around both the main stems and short side branches, becoming continuous near the stem summit.

Golden dock occurs along the banks, mostly below the high water mark, of the lower reaches of the main rivers. From AK east to Que. and south to most of the U.S., much of South America and Eurasia.

PORTULACACEAE Purslane Family

Members of the Purslane Family are mostly small, hairless and often more or less succulent annuals or perennials. Leaves are simple, entire-margined, and alternate or opposite on the stems or all basal. Each radially symmetrical flower contains both sexes. There are usually 2 sepals (6-8 in Lewisia) and 3-6 petals (many more in Lewisia). The number of stamens is usually the same as petals. Fruits are dry capsules with many seeds.

1. Stamens 3; petals 4; stigmas mostly 2; sepals thin, dry, membranous, not green.....Spraguea
1. Stamens 3-50; petals 5-18; stigmas 3-8; sepals mostly green, herbaceous.....2
2. Plants with very slender taproots, rhizomes, or stolons.....3
2. Plants with thick, fleshy taproots or globe- or egg-shaped corms.....6
3. Petals yellow; fruits (capsules) opening in a transverse line bisecting the long axis.....Portulaca
3. Petals white, pink, rose, or lavender; capsules opening by valves running longitudinally.....4
4. Stem leaves mostly 2 and opposite or even joined at their bases to form a disc surrounding the stem at the base of the inflorescence.....Claytonia
4. Stem leaves more than 2, opposite or alternate.....Montia
5. Capsules opening by transverse line fissure bisecting the long axis near the base; stem leaves alternate, opposite, whorled, or none, mostly linear or bractlike, if present.....Lewisia
5. Capsules opening by 3 lengthwise valves; stem leaves 2, opposite or united at the base, usually all lance- or inversely lance-shaped or broader.....Claytonia

Claytonia L. Spring Beauty

Claytonia lanceolata Pursh

Spring Beauty

The 1-many, erect to ascending stems, 5-20 cm (2-8 in) tall, arise from a deep-seated, nearly round, bulblike base (corm). Each stem has a basal pair of linear to lance-shaped, long-petioled leaves that often wither by flowering time leaving only the 2 opposite, narrowly egg- to lance-shaped, sessile stem leaves. The leaves and stems are slightly succulent and easily broken. The 3-15, white to pink flowers have pink veins on the petals and are borne on spreading and downward-curving stalks.

This species extends from the sagebrush-dominated foothills to open alpine slopes, consistently associated with high spring moisture levels, especially the vicinity of late-persisting snowdrifts. Our plants are var. lanceolata and var. multiscapa (Rydb.) C.L. Hitchc. B.C. to CA, east to Alta. and NM.

The corms are sought after and excavated by bears.

Lewisia Pursh Lewisia, Bitterroot

This genus includes smooth perennial herbs, often with succulent foliage. There are 1-several stems or leafless flowering stalks surmounting a short rootcrown and fleshy taproot or a rounded corm. Leaves are mostly basal with blades cylindrical or flat. Flowers are solitary or clustered with 2-9, herbaceous or petal-like sepals. There are 5-18 white to deep rose petals. Seed capsules are 1-chambered, opening near the base.

1. Plants with globe- to oval-shaped corms not >10 mm; basal leaves lacking at the time of flowering; stem leaves 2-3 in a whorl.....(3) L. triphylla
1. Plants with a carrot- or somewhat conical-shaped root >10 mm; basal leaves present at flowering; stem leaves mostly reduced and bract-like.....2
2. Sepals 5-9; one flower per naked flowering stalk, whorled bracts borne about midlength.(1) L. rediviva
2. Sepals 2 (appearing to be 4 because of closely subtending bracts); two to numerous flowers per stem, and bracts not whorled.....3
3. Height of flowering stem 10-20 cm (4-8 in) and bearing several flowers; bracts alternate or lacking.....(4) L. columbiana
3. Height of flowering stem <10 cm (4 in), bearing one flower; pair of opposite bracts.....(2) L. pygmaea

1. Lewisia rediviva Pursh

Bitterroot

This low-growing succulent perennial is inconspicuous except when flowering. By far the major portion of the plants mass is below ground in a thick, long, branched, reddish-brown taproot surmounted by a simple or branched crown. The cylindrical leaves are straight to curved with a broadened, whitish base. They wither at flowering and reappear in late fall or more usually very early spring. A whorl of roughened bracts, 5-10 mm long, is borne in the middle of the otherwise naked flower stalk. The unequal sepals overlap and are rounded at the tip. They are of the same color as the pink to deep rose (rarely white) 12-18 petals that are narrowly oblong to lance-shaped and from 20 to 35 mm long.

Bitterroot favors rapidly drained, usually gravelly and rocky, soils on fully exposed sites. It is abundant in several places in Missoula's foothills and on both sides of the Bitterroot Valley, up to an elevation of about 1830 m (6,000 ft). Waterworks Hill north of Missoula and the Bitterroot Wildflower Park at Woodside north of Hamilton offer spectacular spring displays. From B.C. south on the east slope of the Cascades to s. CA, east to MT, CO, and AZ.

2. Lewisia pygmaea (Gray) Robins.

Pygmy Bitterroot

This is dwarf perennial, up to 10 cm (4 in) tall, with numerous, linear to spoon-shaped, succulent basal leaves atop a thick, short, and carrot-shaped taproot. The petioles have membraneous margins. The several flowering stalks bear single, terminal flowers and, near midlength, 2 opposite linear bracts. The 2 sepals are egg-shaped and either rounded or acute at the tip. Our populations have 5-9, white or greenish-white petals (not pink or rose as in other areas).

In our area pygmy bitterroot is found almost exclusively at high elevations south of the Lost Horse Creek Road in the Bitterroot Mountains. Habitat includes gravelly soils and exposed sites. Many characters of this species are highly variable. Plants of our populations are especially small compared with those of other mountain ranges. Our plants are var. pygmaea. Frequently, at lower elevations, specimens transitional to variety nevadensis (Gray) Fosberg occur. This latter variety is distinguished by entire-margined sepals and leaves at least 15 cm (6 in) long. Our collections of the transitional forms are much larger than v. pygmaea but have mostly glandular and minutely-toothed sepals. These transitional forms also come from the Bitterroot Mountains at 1525 to 2140 m (5,000 to 7,000 ft), elevations mostly 600 m (2,000 ft) lower and many miles distant from sites where our more typical variety, pygmaea, grows. The habitat of transitional forms is more moist, typically gently sloping meadows or wide terraces with partial shade, never on unprotected slopes. From the Olympic and Cascade Mountains south to s. CA and east to MT, NM, and AZ.

3. Lewisia triphylla (Wats.) Robins.

Threeleaf Bitterroot

The small, glabrous threeleaf bitterroot is distinguished by its shallow, nearly round to egg-shaped, and linear basal leaves that wither by the time of flowering. The 1-several stems, up to 10 cm (4 in) tall, have tender and brittle roots. Generally 3(2-5) linear leaves originate near the same point on the stem, just above ground level. Flowers have 5-9 white petals (ours) and oval, rounded, often strongly veined sepals.

This is the smallest, most inconspicuous, and least known member of the genus. Superficially it resembles Claytonia lanceolata, a species with which it often grows. Other common associates are Lewisia pygmaea, Ranunculus eschscholtzii, and Erythronium grandiflorum. It occurs on sites that remain moist late into the spring, such as the vicinity of late melting snowbanks. It is found from valley sagebrush communities to the upper subalpine zone. Widely scattered populations are known from Carlton Lakes Basin in the north to Mount Jerusalem in the south of the Bitterroot Mountains. From WA, east of the Cascades, south to CA and east to MT and CO.

4. Lewisia columbiana (Howell) Robins.

Columbia lewisia

Columbia lewisia is a tufted perennial with several flowering stems mostly 5-15 cm (2-6 in) tall. The numerous, succulent, and densely arranged basal leaves are slightly bluish-green and linear with inversely lance- to spatula-shaped blades that are acute to rounded at the tip. The inflorescence has numerous flowers, each subtended by a glandular and toothed bract. The 7-9 petals are white with pink veins or pink tinged.

This attractive plant's only known location in Montana is lower Tincup Creek Canyon, in the cracks of an extensive granitic outcrop. Our plants are var. wallowensis C.L. Hitchc. From southern B.C. south in the Cascade, Olympic, and coastal mtns. to nw. CA and also ne. OR, adjacent ID, and wc. MT

Montia L. Miner's Lettuce, Montia

This genus is comprised of succulent and glabrous annual and perennial plants that have alternate or opposite leaves. Simple or branched inflorescences are terminal or borne in the leaf axils. Flowers have 2 persistent sepals and 5 white to pinkish, free or basally fused petals. Stamens are arranged opposite the petals. Fruits are 3-valved capsules.

All Montia species grow in moist, often spring-wet areas that are partly to occasionally fully shaded.



m. *Rumex venosus* n. *R. maritimus* o. *Claytonia lanceolata* p. *Lewisia rediviva* q. *L. pygmaea*
 r. *Lewisia triphylla* s. *L. columbiana*

1. Leaves of stem several and alternate with petioles or with narrow base generally slightly swollen and roughened at junction with stem; petals scarcely 5 mm long, rarely greater than sepals.....2
1. Leaves of stem gen. opposite and often sessile, rarely alternate and if so then plants annual with petals at least 2 times as long as the sepals.....5
2. Plants perennial, usually with slender rhizomes; petals 7-15 mm; basal leaves 1.5-3 cm.....(6) *M. parvifolia*
2. Plants annual and nonrhizomatous; petals scarcely 5 mm long; leaves various.....3
3. Sepals about 2 mm; seeds about 1 mm; plants mostly 2-8 cm tall.....(2) *M. dichotoma*
3. Sepals about 2.5-6 mm; seeds 1.5-2 mm; plants mostly 5-20 cm tall.....(1) *M. linearis*
4. Plants perennial with several pairs of opposite, inversely egg-shaped stem leaves; with both rhizomes and stolons.....(7) *M. chamissoi*
4. Plants annual or if perennial then only 1 pair stem leaves; not with stolons and rhizomes.....5
5. Petals mostly 6-13 mm, if >6 mm then at least 2 times length of sepals; stem leaf bases not fused....6
5. Petals mostly <5 mm and not >2 times sepal length; stem leaves often fused at bases..(3) *M. perfoliata*
6. Flowering stalks lacking bracts except for lowest flowers; stem leaves 10-50 mm broad(5) *M. cordifolia*
6. Flowering stalks with bracts above lowest flower, sometimes throughout; stem leaves often <10 mm wide.....(4) *M. sibirica*

Group I. Included here are common annual plants.

1. *Montia linearis* (Dougl.) Greene Narrowleaved Montia, Line-leaf Indian-lettuce
[*Montiastrum lineare* (Dougl.) Rydb.]

The 1-several stems of this short annual are erect to ascending, simple or branched, and mostly less than 20 cm (8 in) tall. Plants often flower when only 3-4 cm tall. The linear, strap-shaped, alternate leaves are all borne on the stem. The 5-12 flowers are arranged mostly to 1 side of a terminal or axillary raceme. Flowers have 5 petals that are shorter to barely longer than the 3-4 mm long sepals. The egg-shaped capsules contain seeds 1.5-2 mm long.

This species is very common and widespread from the river valleys into moist montane areas. It is often associated with the pools remaining after spring melt-off in the company of *Plagiobothrys scouleri*, *Polygonum kelloggii* and *Mimulus floribundus*. From B.C. south to s. CA and east to MT and UT.

2. *Montia dichotoma* (Nutt.) Howell Dwarf Montia
[*Montiastrum dichotomum* (Nutt.) Rydb.]

Dwarf montia is very similar to the above species but is smaller. The stems, only 2-5 cm (1-2 in) tall, the sepals, and seeds are, respectively, only 2 and 1 mm long.

Unlike *M. linearis*, with which it may intergrade, *M. dichotoma* is infrequent in the river valleys. From w. WA to n. CA and east to ID and w. MT.

3. *Montia perfoliata* (Donn) Howell Miner's Lettuce
[*Claytonia perfoliata* Donn]

Slender fibrous roots or weak taproots give rise to several, glabrous and basally branching, erect to ascending stems, to 35 cm (14 in) tall. The basal leaves have long petioles and enormously variable blades. The most consistent character distinguishing this species is the paired stem leaves that grow together to form a disk around the stem just below the inflorescence. Flowers with white or pinkish petals are borne in an inflorescence from pedicels that droop when bearing fruit.

With shade and adequate moisture, plants stay green and attain full size; however, populations in vernal moist habitats become stunted and discolored as moisture decreases. This species is widespread and may sometimes colonize disturbed soil. From B.C. south, on both sides of the Cascades, to Baja Cal. east to the ND, WY, UT, and AZ.

4. *Montia sibirica* (L.) Howell Western Springbeauty, Siberian Montia or Miner's Lettuce, Candy leaf
[*Claytonia sibirica* L.]

This species is usually an annual from a slender taproot, sometimes with short rhizomes. It is branched from the base and usually has several stems, up to 35 cm (14 in) tall. The numerous basal leaves have long petioles, often 2-3 times longer than the lance- to egg-shaped or elliptical blades. Stems have 2 opposite and sessile to short-petiolate leaves that are broadly lance-shaped with tips rounded or tapering to a point. Flowers are arranged terminally in an open inflorescence. There is a small bract at the base of each long, spreading, and slightly downward curved stalk. Petals are white or pinkish and notched at the tip.

Western springbeauty is locally common in the northern part of the Bitterroot Mountains and the Rattlesnake area, often on moist slopes or creek banks, hidden by taller perennials such as *Actaea rubra*,

PORTULACACEAE

Angelica arguta, Mertensia paniculata and Osmorhiza occidentalis. From AK south on both sides of Cascades to s. CA, east to MT and UT.

Group II. These are perennial species that are generally less common than the annuals.

5. Montia cordifolia (Wats.) Pax & Hoffm.
[Claytonia cordifolia Wats.]

Broadleaved Montia or Miner's Lettuce

Though superficially similar to M. siberica, broadleaved montia has a horizontal to ascending rootstock and 1-several erect stems, some as much as 35 cm (14 in) tall. The several to numerous basal leaves are long- to short-petioled with very broadly egg- to heart-shaped blades. The 2 sessile and opposite stem leaves are broadly lance- to egg-shaped. The lax, bractless inflorescences bear up to 10 flowers with spreading to recurved pedicels when in fruit. Flowers have 5 white and barely notched petals, 8-13 mm long, that are more than twice as long as the 2 nearly round sepals.

This is a common species of montane environments, from moist forests to saturated soils of stream and pond banks. Outlier populations occur as high as 2410 m (7,900 ft) on rocky north slopes of Lolo Peak. From s. B.C. south, on both sides of the Cascades, to n. CA, east to w. MT and n. UT.

6. Montia parvifolia (Moc.) Greene

Littleleaf Montia, Streambank Springbeauty

This succulent perennial develops from rhizomes that spread widely through the humus layer or in the moist moss. Individual short rootstocks bear tufts of basal leaves and 1-several stems 10-30 cm (4-12 in) tall. Basal leaves are inversely egg- to lance-shaped with petioles about as long as the blades. The few stem leaves are alternate and much smaller than the basal ones. Flowers, with white or pink petals, are borne on long stalks in an open inflorescence.

This attractive plant occurs from the creek banks in the foothills to moist, shady crevices at timberline elevations. Typical associates in the foothills are ferns and Mimulus spp., while at timberline it is found with Saxifraga debilis and Oxyria digyna. From AK south in the Rocky Mountains to MT, ID, and UT, and in the Cascades and coast ranges to n. CA.

7. Montia chamissoi (Ledeb.) Robins.

Chamisso's or Water Montia

This smooth perennial has both long, slender rhizomes and nearly leafless, nodally rooting runners; both often produce small, terminal small bulbs. Stems, 5-20 cm (2-8 in) long, are mostly erect but can also be ascending or nearly prostrate. The opposite pairs of stem leaves are 2-5 cm (1-2 in) long, inversely egg- to lance-shaped, and gradually narrowed to a short petiole. Most leaves on the runners are greatly reduced. The 3-9 white or pink flowers are borne in terminal and axillary inflorescences.

This species grows in shallows of small streams, mostly in the mud and between rocks of drying streambeds. Only a single collection, from the southwestern portion of the Bitterroot Mountains, documents this species for our area. From AK to s. CA and east to Man., MN, IA, and NM.

Portulaca L. Purslane

Portulaca oleracea L.

Purslane

Purslane is a smooth, succulent, ground-hugging annual whose prostrate stems form mats up to 40 cm (16 in) in diameter. The leaves are inversely egg- to spatula-shaped and mostly 1-3 cm (0.3-1.2 in) long. The small, greenish-yellow flowers are borne in small terminal clusters in the leaf axils. The conical fruits open transversely at their midpoint to release black, minutely pimpled seeds about 1 mm long.

This pernicious weed, native to s. Europe, is widely distributed in temperate and tropical America and is often a garden weed or seen on sun-baked ground between flagstones or the cracks of concrete or asphalt.

Spraguea Torr. Pussypaws

Spraguea umbellata Torr.

Pussypaws

This is a tufted annual or perennial, only 10 cm (4 in) tall, with a strong taproot and a thickened and branched woody base. The spreading branches form mats up to 15 cm (6 in) across. The hairless, densely tufted, and mostly basal leaves are narrowly spatula- to lance-shaped with broad petioles. The mostly leafless flowering stems bear globe-shaped inflorescences about 4 cm wide. Flowers have rounded sepals with wavy pink margins and oblong, pinkish or white petals.

In the Bitterroot Mountains var. umbellata and var. caudicifera Gray intergrade and can be found intermixed. In our area this plant is found only at high elevations, 2500-2650 m (8,200-8,700 ft). Large colonies occur on St. Mary and St. Joseph Peaks and Ward Mountain, where it is associated with Eriogonum pyrolaefolium, Chionophila tweedyi, Luzula hitchcockii, and Juncus drummondii beneath a canopy of alpine larch and whitebark pine. Distributed mostly on the east side of Cascades from B.C. south to Baja Cal., east to MT, WY, and UT.



t. *Montia linearis* u. *M. dichotoma* v. *M. perfoliata* w. *M. sibirica* x. *M. cordifolia* y. *M. parvifolia*
z. *M. chamissoi*

PRIMULACEAE Primrose Family

The primrose family is comprised of annual or perennial herbs with alternate, opposite, or whorled leaves that are simple and mostly entire-margined. The radially symmetrical and bisexual flowers have 4-5 sepals united to various degrees. The 5(4-9)-parted corolla is tubular below and widely flared and deeply cleft to shallowly lobed at the mouth. There are as many stamens as corolla lobes. Fruits are capsules.

1. All leaves in basal rosettes; flowering stems leafless (naked).....2
1. Leaves mainly on flowering stem.....Lysimachia
2. Corolla lobes several times longer than tube and sharply reflexed; stamens protruding full length.....Dodecatheon
2. Corolla lobes <2 times the length of tube, not sharply reflexed; stamens not protruding.....3
3. Plants perennial with densely tufted, small, narrow, persistent leaves; flowers showy pink to violet; calyx somewhat keeled on and below the lobes.....Douglasia
3. Plants annual or perennial; if perennial and with tufted leaves, then flowers white and calyx not keeled along or below lobes.....4
4. Flowers white, mostly <5 mm, sometimes up to 7 mm, the plant then grayish with long hairs....Androsace
4. Flowers mostly pink, violet or purple, sometimes white, length >7 mm; plants never gray with long hairs.....Primula

Androsace L. Fairy-candelabra, Rock-jasmine, Androsace

In our area, this genus is composed wholly of annuals, usually less than 10 cm (4 in) tall, with all the leaves in the basal rosettes. The 1-several naked flowering stalks have a whorl of bracts subtending the umbrellalike inflorescence composed of numerous, diminutive, white flowers.

1. Flowers < 3 mm long; calyx hemispheric and about 2 mm; plants smooth or sparsely glandular and short-hairy above.....(2) A. filiformis
1. Flowers mostly > 3 mm long; calyx top-shaped (inversely conical); plants copiously short hairy.....2
2. Bracts subtending flowers oblong to inversely egg-shaped, 4-10 mm, and 1/3 as broad.....(1) A. occidentalis
2. Bracts subtending flowers awl- to lance-shaped, 3-6 mm long, about 1 mm broad...(3) A. septentrionalis

1. Androsace occidentalis Pursh

Western Androsace

This hairy annual has leaves in a single rosette. They are 10-30 mm long, entire to minutely toothed, grayish and short-hairy, and lance- to spatula-shaped. The 1-many, naked stems, 3-10 cm (2-4 in) tall, have branched hairs and inversely lance-shaped to elliptical bracts at the base of the inflorescence. The calyx is keeled, its tube barely exceeded by the white corolla.

Broadly distributed from bunch-grass dominated foothills to bare ridges and summits of low to mid-elevations. It is conspicuous in July as rust-colored patches consisting of a multitude of withering plants. From the w. slopes of the Rocky Mountains, B.C. south to NM and east to the Mississippi Valley and also AZ and the Sierra Nevada of CA.

2. Androsace filiformis Retz.

Fairy-candelabra

On the average, this annual or biennial is our tallest member of the genus. Flowering stems are 3-12 cm (1-5 in) tall. Leaves are abruptly narrowed to definite petioles. The calyx is rounded, not keeled. The leaves are smooth and 10-30 mm long, with egg-shaped to triangular blades.

Occurs in moist to wet habitats, often around ponds, lakes, ditches, and various moist depressions. In the Rocky Mountains from MT to CO and west along the Columbia River to s. WA and nw. OR.

3. Androsace septentrionalis L.

Northern Androsace

This hairy annual is 3-10 cm (1-4 in) tall with basal leaves that form a single rosette. Leaves are inversely lance-shaped and sparsely to densely set with simple to forked hairs. Narrowly lance-shaped to triangular bracts subtend the 3- to 25-flowered umbels. The calyx is strongly 5-keeled and its lobes are just exceeded by those of the white corolla.

This plant has not been recorded west of the Bitterroot River but is uncommon in the Sapphire Range on barren, high elevation sites. This species is circumpolar, south in the mountains of the w. U.S. to CA, AZ, and NM.

Dodecatheon L. Shooting Star

Shooting stars are perennials bearing nodding flowers that are solitary or borne in an umbrellalike inflorescence. The corollas have a short tube and distinctly reflexed lobes. The stamens converge, but are not fused, around the style.

1. Stigma globe- or head-shaped, about 2 times wider than style.....(3) D. jeffreyi
1. Stigma not globe- or head-shaped, little if any wider than the style.....2
2. Filaments generally shorter than 1(1.5) mm, whether free or fused; tissue connecting anthers is roughened crosswise.....(2) D. conjugens
2. Filaments 1.5 mm or longer; tissue connecting anthers either smooth or wrinkled lengthwise.....3
3. Plant smooth or with sparse short hairs; capsules with thin, flexible walls and lacking hairs.....(3) D. pulchellum
3. Plants densely covered with short hairs or glands and short hairs; capsules short-hairy and with comparatively hard walls.....(4) D. cusickii

1. Dodecatheon pulchellum (Raf.) Merrill

Few-flowered, Woodland or Dark-throat Shooting Star

Woodland shooting star has a very short, erect rootstock with a basal cluster of smooth to sparsely short-hairy, lance- to spatula-shaped leaves that gradually narrow to winged petioles. The blades are 2-15 cm (6 in) long. The united filaments of the anthers form a yellow to orange (rarely purple) tube up to 3 mm long, about 1/2 as long as the anthers and slightly constricted. The connecting tissue between anthers is deep purple, smooth, or wrinkled lengthwise.

Perhaps due in part to its several varieties and ecotypes, woodland shooting star has the broadest ecological amplitude of all our Dodecatheon spp. It ranges from grasslands and shrublands to open alpine meadows. The var. watsonii (Tidestrom) C.L. Hitchc. is 2-5 cm tall and 1-flowered. It is common on high subalpine and alpine sites. Var. pulchellum is up to 40 cm (16 in) tall and has up to 40 flowers in an umbel.

2. Dodecatheon conjugens Greene

Desert or Prairie or Slimpod Shooting Star

This species lacks rootstocks or small bulbs at the base, and the leaves have fine gland-tipped hairs and appear grayish-green. Blades are inversely egg-, lance-, or spatula-shaped with a rounded apex. The yellowish tube formed by the fused stamen filaments is very short (less than 1.5 mm), and the tissue connecting the anther sacs is deep reddish-purple and cross-wrinkled.

Prairie shooting star is locally abundant in moist areas within the grasslands and shrublands of the foothills, often occurring with D. pulchellum and only occasionally with D. cusickii. Our plants are var. viscidum (Piper) Mason. From the east slopes of the Cascades, B.C. to n. CA, east to Alta., MT, and WY.

3. Dodecatheon jeffreyi Van Houtte

Jeffrey's or Tall Mountain Shooting Star

Tall mountain shooting star has sturdy rootstocks connected by rhizomes. It is coarser and taller than other species. The inversely lance-shaped leaves, 5-40 cm (2-16 in) long, have rounded to broadly acute tips and broad to slightly narrowed petioles. The corolla is pink to lavender-magenta (rarely white) with a dark purple ring at the base.

This occurs primarily in moist to wet, montane to subalpine environments, such as meadows, riparian stringers, and open forests. From AK south in the mountains through the Cascades and Olympic Ranges to the s. Sierra Nevada of CA and east to ID and MT.

4. Dodecatheon cusickii Greene

Cusick's Shooting Star

This species is similar to D. pulchellum with the exception that D. cusickii is strongly glandular and short hairy throughout.

Cusick's shooting star is only locally common in the grasslands and shrublands of the foothills, occurring on several sites with D. conjugens and D. pulchellum. The plant is known from Mount Sentinel and the Target Range area near Missoula and southwest of Hamilton. From B.C. to e. WA and e. OR and east to ID and MT. (Not illustrated).

Douglasia Lindl. Douglasia

Douglasia montana Gray

Rocky Mountain Douglasia

Rocky Mountain douglasia is densely branched at the base, the individual tufted basal rosettes coalescing to form mats. The linear lance-shaped leaves are only 4-8 mm long. The 1-4 naked stems, 5-25 mm tall, have diminutive branched hairs and a single terminal flower. The 5-parted, bright pink to deep rose flowers are borne in umbrellalike inflorescences subtended by 1-3, lance-shaped bracts.

This species is one of our earliest blooming and most brightly colored wildflowers. Extensive colonies on Waterworks Hill north of Missoula at 1065 m (3,500 ft) provide a well known display, and many



a. *Portulaca oleracea* b. *Spraguea umbellata* c. *Androsace occidentalis* d. *A. filiformis* e. *A. septentrionalis*
f. *Dodecatheon conjugens* g. *D. pulchellum*

other ridges and summits in our area have dense populations. Douglasia is also widespread in alpine cushion plant communities. In areas of deep snow deposition and late melt-off, single plants or small mats may be thinly scattered and not bloom until August. From NW. WY to Waterton Lakes, Can. westward to ID.

LYSIMACHIA L. Loosestrife

Loosestrifes are hairless, rhizomatous perennials with opposite or whorled leaves, that are spotted or streaked with red. The yellow, often purple-streaked flowers are borne singly in leaf axils or in small, terminal or axillary inflorescences. Both the calyx and corolla are divided nearly to the base. The corolla has a short tube and widely flaring lobes. Fruits are capsules composed of few-seeded chambers.

1. Flowers solitary in the leaf axils.....(1) L. ciliata
1. Flowers not solitary in leaf axils or if so then plant prostrate and leaves oval....(2) L. thysiflora

1. Lysimachia ciliata L.

Fringed Loosestrife

Fringed loosestrife is an erect, mostly unbranched, slender-stemmed perennial, 30-100 cm (12-40 in) tall, with creeping rhizomes. Leaves are 5-15 cm (2-5 in) long and egg-shaped to broadly lance-shaped with rounded or heart-shaped bases. They are paired or in apparent whorls of four. Yellow, 5-petaled flowers arise from the leaf axils on slender, curved stalks.

This plant is locally common on the margins of sloughs, ponds, and slow-flowing river channels, mostly in the shade of shrubs or trees. It is broadly distributed throughout the U.S.

2. Lysimachia thysiflora L.

Tufted Loosestrife

The creeping rhizomes of tufted loosestrife give rise to simple, erect stems, 20-80 cm (8-32 in) tall, that are distinctively mottled or finely purple-black spotted throughout. The opposite, sessile leaves are linear to elliptical lance-shaped. The pale yellow flowers are crowded into short, oval to cylindrical heads on flowering stalks originating from axils of the middle leaves.

This species is uncommon with us, known only from sloughs of the Bitterroot River. It is broadly distributed on the margins of swamps, lakes, and ditches of North America.

Primula L. Primrose

Primula parryi Gray

Parry's Primrose

Parry's primrose is a stout, fleshy, and sticky perennial herb with erect flowering stems to 30 cm (12 in) tall. Leaves, all basal, are erect and about stem height. They are inversely lance-shaped with shallowly toothed margins. The 3-15 5-parted, bright magenta-red flowers with a yellow eye are borne in a terminal umbrellalike inflorescence.

This distinctive and attractive plant has a pungent odor described as "spicy" or "foul". The northernmost record of this plant is a cold north-facing slope above Wyant Lake due west of Hamilton. South from there Parry's primula has been collected on most higher peaks, always on steep and moist north- or east-facing slopes. It occurs most frequently along the route to Trapper Peak, mostly at elevations over 3,050 m (10,000 ft), hidden among the huge gneiss boulders. This species occurs in alpine meadows, talus slopes, and stream banks of the Rocky Mountains from MT and ID to NM, AZ, and UT.

RANUNCULACEAE Buttercup Family

Members of this family are annual or perennial herbs or woody vines. The leaves are simple to compound and alternate, opposite, or whorled. The often showy flowers may be radially or bilaterally symmetrical with few or, more often, many stamens and pistils. Flowers consist of usually 5 separate petals and sepals, or the petals are lacking and the sepals are petal-like. The fruit is several united 1-celled capsules (Delphinium), an achene (Ranunculus) or a berry (Actaea).

1. Plant vinelike with woody, perennial stems.....Clematis
1. Plant a herbaceous perennial.....2
2. Stem leaves opposite or in whorls of 3-4.....3
2. Stem leaves alternate or lacking.....4
3. Stem leaves mostly whorled, petal-like sepals 5 or more.....Anemone
3. Stem leaves opposite, petal-like sepals usually 4.....Clematis hirsutissima
4. Flowers bilaterally symmetrical (divisible into 2 equal halves in only 1 plane).....5
4. Flowers radially symmetrical (circle- or star-shaped).....6
5. Upper petal-like sepal with a long spur extending back.....Delphinium
5. Upper petal-like sepal without a spur.....Aconitum



h. *Dodecatheon jeffreyi* i. *Douglasia montana* j. *Lysimachia ciliata* k. *L. thyrsiflora* l. *Primula parryi*

6. Flowers with long (10-15 mm) spurs.....Aquilegia
6. Spurs of flowers small or lacking.....7
7. Flowers with only 1 style, stigma and ovary (pistil); fruit a red or white berry.....Actaea
7. Flowers with >1 pistil; fruit other than a berry.....8
8. Plants annual with linear basal leaves and leafless stems.....Myosurus
8. Plants mostly perennial; basal leaves broader.....9
9. Flowers with both well-differentiated, usually greenish sepals (sometimes falling early) and colored petals (sometimes falling early).....Ranunculus
9. Flowers without both well-differentiated petals and sepals.....10
10. Leaf blades simple not divided or lobed.....Caltha
10. Leaves branched, divided or deeply lobed.....11
11. Flowers with showy, petal-like sepals at least 10 mm wide.....Trollius
11. Flowers lacking showy petals or sepals.....12
12. Leaves deeply divided but without separate, stalked leaflets.....Trautvetteria
12. Leaves 1-several times divided into stalked leaflets.....13
13. Leaves once divided with 3 leaflets.....Coptis
13. Leaves 2-4 times divided with numerous leaflets.....Thalictrum

Aconitum L. Monkshood

Aconitum columbianum Nutt.

Columbian Monkshood

This is a showy perennial with a short, tuberous roots and erect stems, up to 1.7 m (5 ft) tall, that are glabrous below and glandular-hairy above. Leaves have long petioles below, becoming nearly sessile upward on the stem. The leaf blades are 3-5 times deeply divided into wedge-shaped segments, 5-20 cm (2-8 in) wide. The purplish-blue to whitish, stalked flowers are borne in a narrow, terminal, simple or sparsely branched inflorescence. The 2 small petals with coiled spurs are concealed within the large, helmet-shaped upper sepal. The 2 lateral sepals are fan-shaped, while the lower ones are long and narrow. The fruit is a hairy capsule composed of 3 (to 5) tubular chambers with numerous seeds.

Var. columbianum has blue to purple flowers and is relatively tall and sturdy, while var. ochroleucum A. Nels. has greenish-white to yellow flowers and is mostly smaller, weaker stature. The former is common with shrubs or spruce and fir trees along streams. The latter grows mostly in moist, montane, or subalpine meadows up to 2315 m (7,600 ft). Var. ochroleucum becomes increasingly common from Lost Horse Creek south to Gibbon's Pass where both varieties occur with numerous intermediates. AK to CA, east to MT, SD, CO, and NM.

All parts of the plant are poisonous.

Actaea L. Baneberry

Actaea rubra (Ait.) Willd.

Baneberry

Baneberry is a perennial herb with fibrous roots and simple or sparingly branched stems up to 1 m (40 in) tall. The leaves have long petioles and are 2-3 times divided into sharply toothed, broadly lance-shaped segments. Herbage is slightly hairy. The numerous, small, white flowers are borne in a branched, congested, hemispheric inflorescence. Petals and sepals are 2-3 mm long. The fruit is a showy, globose to elliptic, bright red or shiny white berry 5-11 mm long.

This species is often common in moist, montane forests and valley riparian woodlands, usually in at least partial shade. AK to CA, east through much of North America.

The form with red berries is more common in our area. The berries are poisonous to man and are rarely taken by birds or rodents. I have observed a robin taking one, squashing it and then leaving it.

Anemone L. Anemone, Windflower, Pasqueflower

These are perennial herbs with erect stems from a rootstock or rhizome. The basal leaves are variously dissected, while the stem leaves are in 1-2 whorls, each with 2-4 compound or simple leaves. Flowers are bisexual with numerous stamens and pistils. The petals are lacking, but the 5-many sepals resemble petals. The dry, variously shaped, 1-seeded achenes are borne in a tight, terminal cluster.

1. Styles long, slender and featherlike; sepals 2-4 mm long.....2
1. Styles short and simple; sepals <2 mm long.....3

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2. Sepals white on the outside, sometimes tinged with purple; styles of mature achenes reflexed down; plants mostly subalpine and above.....(6) A. occidentalis
2. Sepals usually blue on the outside; styles of mature achenes spreading; plants mostly of the foothills.....(2) A. nuttalliana
3. Leaves once 3-parted, the relatively wide leaflets lobed or toothed; plants with rhizomes.....4
3. Leaves 2-4 times divided, the leaflets relatively narrow; plants lacking rhizomes.....5
4. Basal leaves 1 or lacking; achenes short-hairy, plants of forests.....(3) A. piperi
4. Basal leaves numerous; achenes woolly, plants of more open habitats.....(7) A. parviflora
5. Mature achenes grouped in a cylindrical cluster >2 times as long as thick.....(4) A. cylindrica
5. Mature achenes grouped in a globose cluster <2 times as long as broad.....6
6. Styles usually yellow; flowers 1 per stem; sepals usually blue on the outer surface; plants of timberline or above.....(5) A. drummondii
6. Styles usually red; flowers often 2-3 per stem; sepals white or yellow on the outer surface; foothills or lower montane.....(1) A. multifida

1. Anemone multifida Poir

Pacific Anemone

Pacific anemone is sparsely hairy with 1-several stems up to 40 cm (16 in) tall from a branched rootstock. The numerous basal leaves have long petioles and fan-shaped blades that are 3-10 cm (1-4 in) wide and 2-3 times deeply divided into narrowly lance-shaped segments. The whorled stem leaves are similar and have short petioles. There are 1-3 long-stalked flowers per stem. The 5-9 greenish-white or yellowish sepals are 7-15 mm long. The achenes have reddish styles and are borne in a globose cluster.

Our plants are var. multifida. This species of dry foothills meadows is locally common in the Sapphire and Rattlesnake ranges and uncommon to rare west of the Bitterroot River. AK to CA, east to NY and NM; South America.

Outside of our area this species often has bluish purple or dull red flowers.

2. Anemone nuttalliana DC.

Pasqueflower

[A. patens L., Pulsatilla patens (L.) Miller]

Pasqueflower blooms close to the ground amid a cluster of unexpanded basal leaves. By the time the fruit is mature, the stems may be up to 25 cm (10 in) tall, and the basal leaves have long petioles and fan-shaped blades that are 3 times deeply divided into numerous linear divisions. Stem leaves are similar in shape but smaller and without petioles. The herbage is covered with long, silky hairs. The solitary flowers have 5-7 sepals, 2-4 cm long, that are various shades of blue or purple on the outside and lighter colored on the inside. When the sun is shining, they unfold into a star shape about 7-8 cm in diameter. The mature achenes have slender, featherlike styles, 2-4 cm long, that spread in all directions from the globose head.

This plant is found in dry meadows in the valley and montane zones. It is most common in the Sapphire Range and occurs only sporadically in the foothills west of the Bitterroot River south to the confluence of the West and East forks. AK to WA and MT, south to TX and east to IL; Europe, Siberia.

This is the most beautiful of our anemones and one of the best loved of our early spring flowers. It is less common in the foothills around Missoula than 25 years ago.

3. Anemone piperi Britt.

Piper's Anemone

This species has mostly solitary stems up to 15 cm (6 in) tall arising from vertical rootstocks attached to long, deep-seated rhizomes. The solitary (absent) basal leaf has long petioles and is divided into 3 coarsely toothed and lobed, lance-shaped segments. The whorled stem leaves are similar with shorter petioles and larger blades. Flowers are solitary at the tips of the stems. The 5-7 sepals are white and 12-16 mm long. The achenes lack a distinctive style.

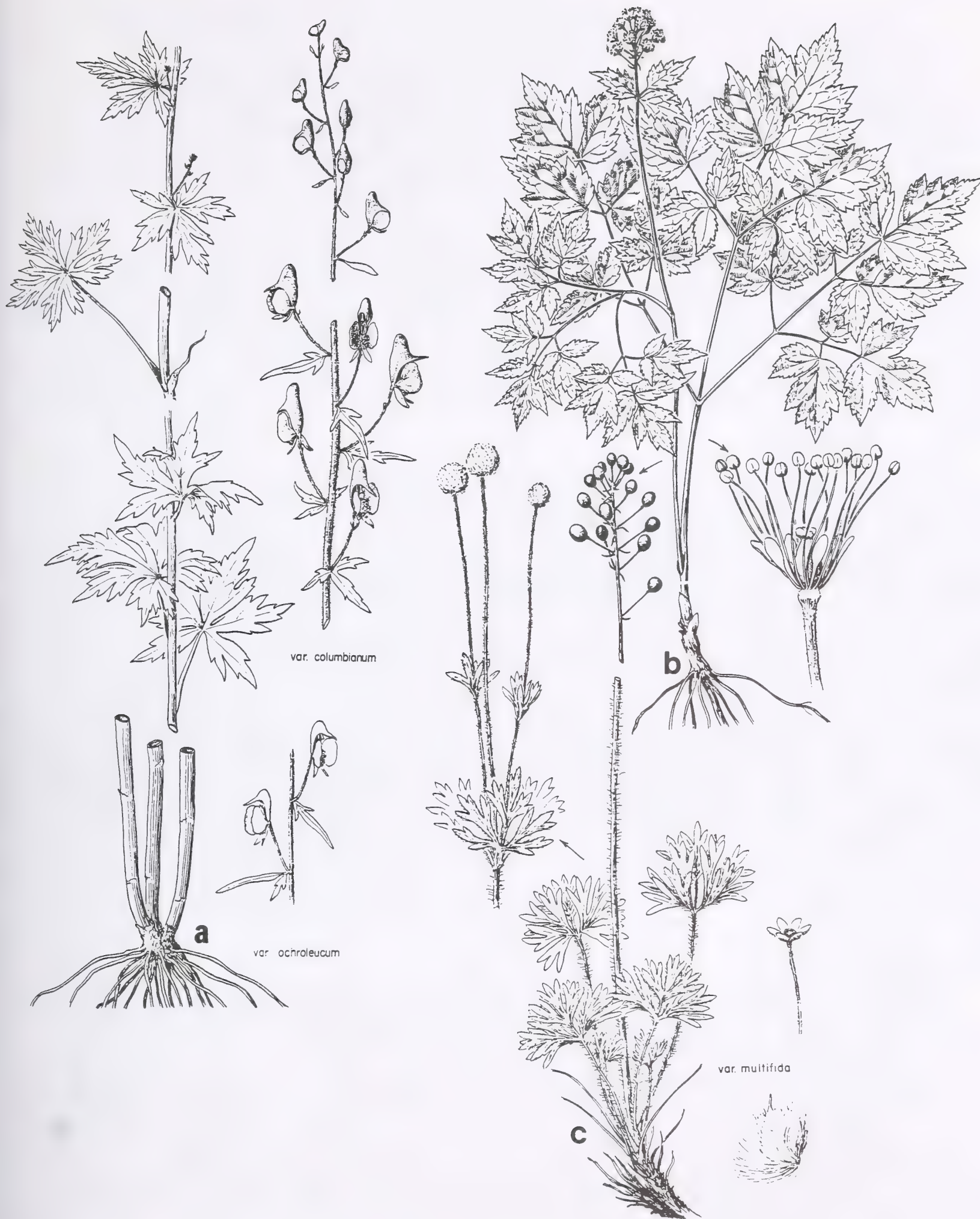
This is a delicate and charming flower of mesic evergreen forests in the montane and lower subalpine zones. It occurs west of the Bitterroot River, from Lolo Creek south to the West Fork area. Eastern WA and OR, central ID and west-central MT.

4. Anemone cylindrica Gray

Thimbleweed

This fibrous-rooted species has grayish-hairy herbage and stems that are up to 60 cm (2 ft) tall. The numerous basal leaves have long petioles and blades that are 3-5 times divided and toothed. The whorled stem leaves are similar with shorter petioles. The 2-6 greenish-white flowers are borne on long stalks. The 5-6 sepals are 8-12 mm long, and the woolly achenes are clustered in a cylindrical head.

This inconspicuous anemone occurs in the open foothills of the Rattlesnake drainage and the Sapphire Range south of Corvallis. It is not known from west of the Bitterroot River. B.C. to NM and AZ, east to NJ.



a. *Aconitum columbianum* b. *Actaea rubra* c. *Anemone multifida*

5. Anemone drummondii Wats.
[A. lithophila Rydb.]

Drummond's Anemone

Drummond's anemone has stems up to 15 cm (6 in) tall and herbage sparsely covered with long hairs. The basal leaves have long petioles and fan-shaped blades, 2-4 cm wide, that are 3-4 times divided into nearly linear ultimate segments. The stem leaves are similar with short petioles. Flowers are solitary. The 6-9, short-hairy sepals are 10-20 mm long and white or greenish tinged with blue at the base. The silky-hairy achenes are borne in a nearly globose cluster.

Our plants are var. lithophila (Rydb.) Hitchc. In our area this anemone occurs at or above timberline in rock crevices or gravelly soil below late melting snow. AK to CA, east to Alta. and MT.

6. Anemone occidentalis Wats.

Western Pasqueflower

The stems of this species are rarely more than 20 cm (8 in) tall at flowering but expand to 50-60 cm (20-24 in) tall in fruit. The herbage is densely long-hairy. The few basal leaves have long petioles and triangular blades deeply 3-4 times divided into numerous linear segments reminiscent of parsley. The stem leaves are short-petioled or sessile. The greenish, white, or cream-colored sepals are 2-3 cm long and rounded at the tip. The achenes have long, reflexed, featherlike styles that are clustered into shaggy, cylindrical "mop-heads." Western pasqueflower is found in open or partially shaded habitats in the subalpine zone along the Selway-Bitterroot Divide from One Horse Lake to Watchtower Peak. It occurs at 2590 m (8,500 ft) on El Capitan and Como Peaks. B.C. to CA, east to OR, ID, and MT.

The beautiful flowers are rarely seen because they bloom at a time when most trails and mountain passes are still deep in snow.

7. Anemone parviflora Michx.

Northern Anemone

This small anemone has stems up to 18 cm (7 in) tall from long, slender rhizomes. The herbage is nearly glabrous to densely hairy. The clustered basal leaves are petiolate and 3-parted with deeply cleft to shallowly lobed leaflets. The whorled, 3-parted stem leaves lack petioles. The 5-6 sepals are usually 10-15 mm long, dull white above and bluish below, but the color and size are quite variable. The cluster of woolly achenes is globose to egg-shaped.

Northern anemone occurs on dry to moist, sparsely vegetated slopes and ridges in areas of limestone, usually in the subalpine zone or above. It has been collected in the Rattlesnake Mountains, but is not known in the Bitterroot Mountains. AK to the Atlantic coast, south to OR, ID, and CO.

Aquilegia L. Columbine

Aquilegia flavescens Wats.

Yellow Columbine

This is an erect, perennial herb with stems that are 20-60 cm (8-24 in) tall and glabrous to glandular-hairy. The leaves are mainly basal and long-petioled with blades that are twice divided in 3's, the leaflets deeply lobed and toothed. The 1-few stem leaves are smaller and only once divided. The foliage is waxy green above and short-hairy below. The few showy, bisexual flowers are borne on nodding stalks in the open inflorescence. The 5 yellow or pinkish sepals are 15-25 mm long and petal-like, while the yellow petals are horn-shaped and 10-15 mm long with incurved ends. There are numerous stamens. The fruit is a dry, 5-chambered capsule.

Yellow columbine is common in the mountains, most often near streams, in the montane to timberline zones. B.C. to WA, east to Alta., UT, and CO.

At higher elevations the sepals are most always yellow. At lower elevation, especially in the southern Bitterroot Mountains, the sepals are often pink or even red, perhaps representing hybrids with the more western A. formosa.

Caltha L. Marsh Marigold

These are low, perennial herbs with simple, mainly basal leaves and glabrous, succulent foliage. The 1-2 flowers are borne on the ends of long stalks. Petals are lacking, and the sepals are petal-like. There are numerous stamens, and the fruit is a dry, several- to many-chambered capsule.

- 1. Basal leaf blades definitely longer than wide; flowers 1 per stem.....(1) C. leptosepala
- 1. Basal leaf blades nearly round in outline; flowers usually 2 per stem.....(2) C. biflora

1. Caltha leptosepala DC.

Elkslip, Eastern Marsh Marigold

This species has mostly leafless and 1-flowered stems 5-30 cm (2-12 in) high. The basal leaves have petioles and spade-shaped blades, longer than wide, with shallowly toothed margins. The sepals are white or sometimes bluish on the outside.

Elkslip is locally common in wet, open to partially shaded habitats in the subalpine zone of all our mountains. It has also been found above timberline with Salix arctica and Lloydia serotina on El Capitan and at timberline above the Chaffin Lakes. AK south to NV, AZ, and CO.



d. *Anemone nuttalliana* e. *A. piperi* f. *A. cylindrica* g. *A. drummondii* h. *A. occidentalis*

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High elevation plants have distinctly bluish-tinged sepals, while those from lower elevations are white to cream-colored.

2. Caltha biflora DC.

Twinflowered Marsh Marigold

Twinflowered marsh marigold is similar to the former species, but there are usually 2 long-stalked flowers, 1 leaf per stem, and the basal leaf blades are nearly round in outline.

Our plants are var. rotundifolia (Nuth) Hitchc. This species has been found on the banks of Twin Lakes and on Bear Creek Pass in the Bitterroot Mountains southwest of Hamilton. AK to CA, east to MT, UT, and CO.

Clematis L. Virgin's Bower, Clematis

Members of this genus are herbaceous perennials with erect stems or woody vines that climb with clasping, modified petioles. The leaves are opposite or whorled and simple to pinnately compound. Flowers are solitary or borne in open, pyramid-shaped inflorescences. True petals are absent, but the sepals are petal-like. There are numerous stamens. The fruit is an achene with a persistent, long, featherlike style.

1. Leaves divided into only 3 leaflets.....(1) C. columbiana
1. Leaves divided into 5-7 leaflets or many linear segments.....2
2. Flowers white; leaves with 5-7 leaflets.....(2) C. ligusticifolia
2. Flowers blue to deep purple; leaves dissected into numerous linear segments.....(3) C. hirsutissima

Group I. These plants are at least somewhat woody and vinelike.

1. Clematis columbiana (Nutt.) T. & G.

Columbia Virgin's Bower

This is a sparsely pubescent perennial with climbing or trailing, woody stems up to 2 m (6 ft) long. The petiolate leaves have 3 leaflets that have toothed or entire margins and are rounded at the base and pointed at the tip. The solitary flowers are nodding on long stalks arising from the leaf axils. The 4 bluish-purple sepals are 3-6 cm (1-2 in) long and tapered to a point. The narrow, featherlike styles are 3-6 cm long.

A beautiful woodland climber. The plant is common on brushy slopes above creek bottoms from the valleys to the lower subalpine zone. It is seldom found in dense coniferous forests but may occasionally occur in rock outcrops or talus slopes. B.C. to OR, east to MT and WY.

2. Clematis ligusticifolia Nutt.

White Virgin's Bower

White virgin's bower is a semi-woody vine with climbing stems up to 6 m (20 ft) long. The leaves are pinnately divided into 5 or 7 leaflets. These are petiolate and lance-shaped to egg-shaped with prominently toothed margins. The white flowers are borne in branched, pyramid-shaped inflorescences arising from the leaf axils. Male and female parts occur on different flowers borne on the same plant. The spreading, petal-like sepals are 6-15 mm long. Styles are 25-50 mm (1-2 in) long.

This prolific vine is common in valley riparian areas as well as along railways and highways. B.C. to CA, east to ND and NM.

White virgin's bower forms a dense mass of growth on shrubs or small trees and can even be found on strong perennial herbs such as nettles and tansy.

Group II. This species is a sturdy perennial herb.

3. Clematis hirsutissima Pursh

Sugarbowls

Sugarbowls usually has several erect stems up to 60 cm (2 ft) tall from a woody base. The nearly sessile leaves are 2-4 times pinnately divided into linear segments. Herbage is densely white-hairy but may be nearly glabrous at maturity. The solitary, nodding flowers terminate the stems. The 4 sepals are united at the base and form an urn-shaped flower that is glabrous and deep brownish-purple inside and densely white hairy on the outside. The styles are 25-45 mm (1-2 in) long.

This plant occurs only on the open, west-facing, grassland slopes on the east side of the Bitterroot River and north of Missoula. B.C. to OR, east to MT and WY.

Coptis (Nutt.) Salisb. Gold Thread

Coptis occidentalis (Nutt.) T. & G.

Yellowthread, Western Gold Thread

This is a low perennial, evergreen herb with simple, leafless flowering stems, 8-16 cm (3-6 in) tall, from slender, spreading rhizomes. The leaves have long, wiry petioles and blades divided into 3 shiny



i. *Anemone parviflora* j. *Aquilegia flavescens* k. *Caltha leptosepala* l. *C. biflora* m. *Clematis columbiana*

leaflets that are oval in outline, 3-lobed, and sharply toothed. The 1-3 whitish flowers have 5-8 narrow sepals, 5-10 mm long, and 5-7 smaller and narrower petals. There are 12-25 stamens, and the fruit consists of numerous narrow, dry chambers that spread apart at maturity.

Western golden thread is locally common in mesic forests of the lower canyons of the Bitterroot Mountains south to the West Fork of the Bitterroot River. Northern ID and adjacent WA, B.C., and MT.

This plant is very shade tolerant and is frequently associated with western red cedar, grand fir, yew, and Clintonia. It blooms in early spring, often between patches of melting snow.

Delphinium L. Larkspur

All our species are perennial herbs with tuberous or fibrous roots and erect stems that are simple or branched above. Leaves are alternate, nearly orbicular in outline, and deeply lobed or divided. The showy, blue to partly whitish flowers are bisexual, bilaterally symmetrical, and borne in simple or compound inflorescences. There are 5 petal-like sepals, the uppermost prolonged into a spur. The 4 petals are smaller than the sepals; the upper 2 are partly enclosed by the upper sepal, and the lower 2 are often hairy and lobed at the tip. There are numerous stamens and 3 styles. The fruit is composed of united, erect or spreading, dry capsules with numerous seeds.

- 1. Sepals usually <15 mm long; plants of moist to wet meadows.....(3) D. occidentale
- 1. Sepals >15 mm long; plants mostly of grasslands or drier meadows.....2
- 2. Roots tuberous; plants uncommon in open montane meadows.....(2) D. nuttallianum
- 2. Roots fibrous; plants most common in foothills grassland and shrubland.....(1) D. bicolor

1. Delphinium bicolor Nutt.

Low Larkspur

Low larkspur has mostly simple stems, 10-140 cm (4-55 in) tall, from slightly fleshy, fibrous roots. The mostly basal leaves have long petioles and nearly orbicular blades that are 3-4 times divided into linear oblong segments. The herbage is glabrous to densely hairy and beset with yellowish glands. The deep bluish-violet flowers are borne on stalks in mostly unbranched inflorescences. Sepals are 15-25 mm long. The white upper petals are lined with blue, while the lower ones are entirely blue and shallowly notched.

This is our most widespread larkspur, common in sagebrush and grasslands throughout the foothills. It is rare in the montane zone, but is not uncommon in open habitats in the subalpine and timberline zones. Northeast WA to Sask., south to SD and WY.

The plant has proven to be dangerously poisonous to cattle.

2. Delphinium nuttallianum Pritz.

Upland Larkspur

This species is vegetatively similar to the former, but the stems arise from a cluster of tuberous roots, and the ultimate leaf segments are narrower. The sepals are 17-25 mm long, and the spur is longer than in D. bicolor.

Upland larkspur is infrequent in open areas of montane ridges in the southern Bitterroot Mountains in more mesic habitats than D. bicolor. B.C. to CA, east to Alta., NE, and AZ.

Highly variable in size and color of flower parts as well as the shape of the roots. 5 varieties have been described. Our plants are referable to var. fulvum Hitchc.

3. Delphinium occidentale Wats.

Tall Larkspur

Tall larkspur has sturdy, hollow stems up to 2 m (6 ft) tall from deep vertical roots. The few basal leaves wither early. The stem leaves have long petioles and blades divided into 3-7 segments that are lobed or deeply toothed. The herbage is mostly glabrous below to glandular-hairy above. The deep to light bluish-purple flowers are borne in a congested, branched inflorescence. Sepals are 9-15 mm long. The upper petals are whitish to pale blue, while the lower ones are blue.

This plant is most common in subalpine meadows of moist slopes and along streams. Northeast OR to MT, south to CO.

Tall larkspur is frequently associated with other tall herbs such as Rudbeckia occidentalis, Senecio triangularis, and Saussurea americana. Large expanses of these communities occur northwest of Bass Lake, above the South Fork of Lolo Creek and above Watchtower Creek in the Bitterroot Mountains.

Myosurus L. Mousetail

These are small, annual herbs with fibrous roots and leafless stems with a solitary, terminal flower. The basal leaves are undivided and linear. The 5 greenish sepals are spurred at the base. The whitish petals are smaller than the sepals or lacking. The fruit is a spike of congested achenes that elongates as it matures.

- 1. Sepal blade distinctly longer than spur; achene beak <6 mm long.....(1) M. minimus
- 1. Sepal blade ca. equal to spur; achene beak >7 mm long.....(2) M. aristatus



n. *Clematis ligusticifolia* o. *C. hirsutissima* p. *Coptis occidentalis* q. *Delphinium bicolor*
r. *Delphinium nuttallianum*

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1. Myosurus minimus L.

Common mousetail

Common mousetail has stems 2-15 cm (1-6 in) tall and basal leaves up to 10 cm (4 in) long. The sepal blades are 1-3 mm long, longer than the spurs. The petals are about as long as the sepals. The fruit is 5-60 mm long with 20-200 achenes. The beak of the achene is 0.2-0.5 mm long.

This inconspicuous plant occurs in open, valley, or montane habitats that are moist to wet in spring but dry by early summer. It has been collected in heavily grazed meadows south of Missoula and at Fales Flat southwest of Darby. B.C. to CA, east to Ont., NC, and TX; Europe.

2. Myosurus aristatus Benth.

Sedge Mousetail

This species has stems up to 10 cm (4 in) tall and leaves up to 7 cm (3 in) long. The sepal blades are 1-3 mm long, about equal to the spurs. Petals are often lacking. The fruiting spike is 5-20 mm long at maturity with 20-50 achenes. The achenes are distinctly keeled on the back with a beak 0.8-1.5 mm long.

Our only collection is from a grazed meadow in the foothills of the northern Bitterroot Mountains at about 1005 m (3,300 ft). B.C. to CA, east to MT, WY, and UT.

Ranunculus L. Buttercup, Crowfoot

This genus contains perennial or occasionally annual herbs with simple to compound, alternate leaves. The flowers are solitary or borne in small inflorescences. The 5 petals are yellow or white (rarely lacking) with a nectar gland at the base. Stamens and pistils are few to numerous. The fruit is a globose to oblong head of numerous, congested, mostly beaked achenes.

1. Flowers white; plants aquatic; leaves divided into threadlike segments.....2
1. Flowers yellow; plants mostly not true aquatics; ultimate leaf segments broader.....4
2. Leaves with definite, slender petioles, collapsing when taken from the water.....(2) R. aquatilis
2. Leaves with broadened, stipulelike bases but lacking slender petioles, not collapsing when taken from the water.....3
3. Achene beak >0.7 mm long.....(3) R. longirostris
3. Achene beak <0.4 mm long.....(4) R. subrigidus
4. Basal leaves with margins that are entire, shallowly toothed or scalloped $\leq 1/3$ their length.....5
4. Basal leaves with blades that are lobed or divided usually at least $1/2$ their length.....11
5. Basal leaf blades narrowly lance-shaped, >2 times as long as broad.....6
5. Basal leaf blades broadly lance-shaped to nearly orbicular, <2 times as long as broad.....7
6. Stems prostrate and rooting at the nodes; petals usually 4-5 mm long.....(5) R. flammula
6. Stems erect, not rooting at the nodes; petals mostly 5-10 mm long.....(20) R. alismaefolius
7. Stem leaves or bracts not divided or lobed.....8
7. Stem leaves deeply divided or lobed.....9
8. Stem leaves or bracts linear or lacking.....(6) R. cymbalaria
8. Stem leaves or bracts broadly lance-shaped.....(19) R. populago
9. Petals >8 mm long; stems mostly <15 cm (6 in) tall; plants mostly in sagebrush or bunchgrass communities.....(1) R. glaberrimus
9. Petals <8 mm long; stems usually >15 cm tall; plants of open forest to subalpine meadows.....10
10. Achenes in an egg-shaped cluster; achene beak <0.2 mm long.....(14) R. abortivus
10. Achenes in a cylindrical cluster; achene beak >0.5 mm long.....(21) R. inamoeris
11. Plants with prostrate stems that root at the nodes.....12
11. Plants with mostly erect stems that do not root at the nodes.....15
12. Plants of gardens, lawns, or other disturbed habitats.....(23) R. repens
12. Plants growing in wet mud or semi-aquatic habitats.....13
13. Petals >9 mm long; achenes >1.5 mm long with a stout beak >1 mm long.....(9) R. flabellaris
13. Petals <9 mm long; achenes <1.5 mm long with a beak <1 mm long.....14
14. Leaf blades only once 3-5 lobed.....(10) R. natans
14. Leaf blades 2-3 times divided.....(7) R. gmelinii

15. Plants with stems <8 cm (3 in) long; petals <6 mm long.....16
15. Plants with stems >8 cm long (occasional small specimens of *R. eschscholtzii* have petals >6 mm long).....17
16. Achenes with daggerlike beak 3-4 mm long; plants of disturbed areas in the valleys.....(24) *R. testiculatus*
16. Achene beak ca. 0.5 mm long; plants of alpine habitats.....(22) *R. pygmaeus*
17. Lower stem and leaves glabrous.....18
17. Lower stem and leaves hairy, usually densely so.....21
18. Petals 2-5 mm long.....19
18. Petals ≥ 7 mm long.....20
19. Achenes with hooked beaks, borne in globose clusters.....(15) *R. uncinatus*
19. Achenes with a very short unhooked beak, borne in cylindrical clusters.....(8) *R. sceleratus*
20. Leaf blades tapered to the petioles; plants mostly of valley to montane zones.....(1) *R. glaberrimus*
20. Leaf blades heart-shaped at the base; plants mostly subalpine or above.....(18) *R. eschscholtzii*
21. Petals 2-6 mm long.....22
21. Petals >8 mm long.....24
22. Leaflets of basal leaves sessile; achenes with hooked beaks.....(15) *R. uncinatus*
22. Leaflets of basal leaves with petioles; achenes with straight beaks.....23
23. Petals shorter than sepals; achene beaks <1 mm long.....(16) *R. pensylvanicus*
23. Petals equal to or exceeding the sepals; achene beaks ≥ 1 mm long.....(13) *R. macounii*
24. Sepals spreading; achene beak <0.7 mm long; basal leaves 4-5 times divided.....(12) *R. acris*
24. Sepals usually reflexed; achene beak ≥ 1 mm long; basal leaves 2-3 times divided.....(11) *R. acriformis*

Group I. This native buttercup occurs in vernal moist but otherwise dry habitats from the valleys to mid-elevations in the mountains.

1. *Ranunculus glaberrimus* Hook.

Sagebrush Buttercup

Sagebrush buttercup is a small, perennial herb with a cluster of fleshy roots and mostly simple, prostrate or erect stems, 5-15 cm (2-6 in) long, that do not root at the nodes. The basal leaves have long petioles and lance-shaped to nearly orbicular blades that are entire-margined or shallowly 3-lobed. The 1-several stem leaves are lobed or entire and short-petiolate to sessile. The 5 sepals are tinged with purple. The yellow petals are 8-15 mm long. There are 40-80 stamens, and the fruit is a nearly globose cluster of achenes with straight, short, flattened beaks.

Var. *glaberrimus* has mostly undivided stem leaves and egg-shaped, basal leaf blades that are often 3-lobed. It is most common in dry, open habitats of the valleys and foothills. Var. *ellipticus* Greene has elliptical to lance-shaped, entire basal leaf blades and entire to 3-lobed stem leaves. It is more montane than the former variety. These varieties cannot always be distinguished, and numerous transition forms occur in the foothills. B.C. to CA, east to ND, NE, and NM.

In our area this is the very first flower to open. They have appeared as early as the last days of January or as late as mid-March. It is the only dryland buttercup of the valleys. Its waxy, yellow flowers brighten the spring landscape, but the plants have completely disappeared by mid-July.

Group II. These are perennial, aquatic plants with lax stems adapted to floating on water. The leaves are highly divided, and the flowers are white. Solitary flowers are borne on long stalks arising from the leaf axils.

2. *Ranunculus aquatilis* L.

White Water-buttercup, Water Crowfoot

Water crowfoot has branched stems up to 1 m (3 ft) long and leaves that collapse when taken from the water. The leaves have short petioles and blades with 3 leaflets that are dissected into long, very fine segments. The flower stalks are slightly recurved in fruit. Petals are white and 5-10 mm long. The beaks of the achenes are less than 1 mm long.

Our plants are var. *capillaceus* (Thuill.) DC. This species is common in shallow ponds, lakes, sloughs, and slow-moving streams in the valleys and foothills. Throughout much of North America and Europe.

3. *Ranunculus longirostris* Godr.

Long-beaked Water-buttercup

A glabrous species with stems usually less than 1 m (3 ft) long, long-beaked water-buttercup has finely dissected leaves similar to *R. aquatilis*, but they do not collapse when taken from the water. The



s. *Delphinium occidentale* t. *Myosurus minimus* u. *M. aristatus* v. *Ranunculus glaberrimus* w. *R. aquatilis*
 x. *Ranunculus longirostris*

flower stalks do not become recurved in fruit. The white petals are 6-8 mm long. Achenes are wrinkled on the faces and the beaks are about 1 mm long.

This plant is infrequent in slow or standing water in the valley zone in the north part of our area. Sask. to Que., south to NV, NM, TX, and AL.

This species is very similar to the more common R. aquatilis.

4. Ranunculus subrigidus W. Drew.
[R. circinatus Sibth.]

Stiff-leaved Water-buttercup

This species is intermediate in appearance between R. aquatilis and R. longirostris. The leaves lack petioles; the blades are borne on a short, stipulelike appendage and do not collapse when taken from the water. The flower stalks become recurved in fruit. Petals are white and 5-9 mm long. The achenes are wrinkled on the faces and the beak is very short or lacking.

This plant has been collected in sloughs of the Bitterroot River near Stevensville. B.C. to Que, south to Mex., MN and MA.

This species is very similar to the more common R. aquatilis.

Group III. Species in this group are semi-aquatic, occurring most often in mud or very shallow water. They often root at the nodes or are stoloniferous.

5. Ranunculus flammula L.

Spearwort Buttercup

This plant has slender, creeping stems up to 40 cm (16 in) long that are sparingly branched and root at the nodes. The leaves are paired or occasionally clustered at the nodes. The blades are linear to narrowly lance-shaped and entire margined. Lower leaves have petioles but become sessile toward the tip. Flowers are borne on leafy-bracted side branches at the distant nodes. The 5 sepals fall early. Petals are yellow and about 4-5 mm long. The achenes are smooth with a style about 0.5 mm long.

Spearwort buttercup is common in wet mud from the valley floodplains to subalpine ponds and lakes. Circumboreal and through much of North America.

6. Ranunculus cymbalaria Pursh

Shore Buttercup

This is a small, stoloniferous (producing runners) mostly glabrous perennial with erect, sparingly branched stems 2-12 cm (1-5 in) tall. The basal leaves have long petioles and undivided, spade-shaped blades with shallowly lobed margins toward the tip. The 1-few flowers are borne in an open inflorescence at the end of the stems. The 5-several yellow petals are 3-8 mm long. The glabrous achenes, prominently grooved on both faces, have a straight beak, 0.5 mm long, and are borne in a cone-shaped cluster.

Shore buttercup is common along rivers, on shores of ponds and lakes, in wet meadows, and in ditches along roads in the valley and montane zones. Much of North America, South America, and Eurasia.

7. Ranunculus gmelinii DC.

Gmelin's Buttercup

Gmelin's buttercup is glabrous with stems up to 50 cm (20 in) long that root at the nodes when growing on mud. The leaves have slender petioles and blades up to 2 cm long that are 3-4 times divided into linear to lance-shaped segments. Petals are yellow and 3-7 mm long. The achenes are whitish on the lower half, and the beaks are 0.5-1 mm long.

Gmelin's buttercup is highly variable in form and able to tolerate fluctuating water levels. It is locally common in shallow water and on mud flats in the valley zone and is especially common in marshy meadows of the Bitterroot River floodplain. Our plants are var. hookeri (G. Don) Benson. Throughout much of Asia and North America.

8. Ranunculus sceleratus L.

Blister Buttercup, Celery-leaved Buttercup

Blister buttercup is an annual with 1-few erect stems, 15-40 cm (6-16 in) tall, from slender, fleshy roots. It does not root at the nodes. The basal leaves have long petioles and broadly spade-shaped blades, 2-5 cm (1-2 in) long, that are deeply divided into 3-5 toothed or lobed, round-tipped segments. The stem leaves are smaller and less divided. The spreading sepals are slightly longer than the 5 small (2-5 mm), yellow petals. The egg-shaped achenes with pock-marked faces and thickened margins are borne in a cylindrical cluster.

This plant is known from wet, open habitats in the valley zone east of the Bitterroot River and in the Rattlesnake drainage. Much of North America; Eurasia.

9. Ranunculus flabellaris Raf.

Yellow Water-buttercup

The stems of this perennial are hollow, freely branching, and floating or prostrate and rooting at the nodes. The leaves are nearly orbicular to spade-shaped in outline and 2-8 cm long. The submersed leaves are divided into numerous narrowly linear segments, while the emersed leaves are smaller with 3-5 lobed and toothed, fan-shaped segments. The 1-7 stalked flowers are borne in an open inflorescence at the ends of the stems. The 5-6 yellow petals are 5-8 mm long, much longer than the sepals. Achenes have a prominent corky-thickened lower margin and a broad, straight, flat beak up to 2 mm long.

RANUNCULACEAE

Yellow water-buttercup is known from wet mud in the Bitterroot River floodplain. B.C. to CA, east to Que., NY, and LA.

This species could be confused with R. *gmelinii* but can be distinguished by its larger size and prominently beaked achene.

10. Ranunculus *natans* C.A. Mey.

Floating Water-buttercup

Floating water-buttercup has stems up to 50 cm (20 in) long that root at the nodes. Leaves have slender petioles, and the blades are 5-15 mm long and broadly spade-shaped with 3-5 rounded lobes. The flower stalks are not recurved in fruit. The yellow petals are 3-5 mm long. Achenes are smooth with a beak less than 0.5 mm long.

This species is infrequent in shallow water or on mud flats in the valley and montane zones. Circumboreal, south in North America to ID and CO.

A similar species, R. *hyperboreus* Rottb., has been found just east of our area and could be expected in the Sapphire Range. It can be distinguished by having leaves that are flattened at the base rather than spade-shaped.

Group IV. This group of species all have tall, erect, hollow stems and yellow flowers. They occur in moist meadows and open forest from the floodplains to the subalpine zone.

11. Ranunculus *acriiformis* Gray

Sharpleaf Buttercup

Sharpleaf buttercup is a hairy perennial with 1-few branched stems, 30-60 cm (1-2 ft) tall, that are erect or curved at the base but do not root at the nodes. The basal leaves have long petioles and blades, up to 6 cm (2 in) long, that are 2-3 times divided into 3's with wedge-shaped ultimate segments. The greenish sepals are reflexed and fall early. The 5 or (rarely) 10 petals are 8-16 mm long. The glabrous achenes have a flattened and prominently hooked beak that is 1-1.5 mm long.

Our plants are var. *montanensis* (Rydb.) Benson. This common native buttercup is often found in large colonies in acidic meadows west and south of the Bitterroot River. Central ID and W. MT, south to UT and CO.

12. Ranunculus *acris* L.

Tall Buttercup

This tall, spreading-hairy perennial has erect stems 30-100 cm (1-3 ft) tall. The basal leaves have petioles up to 20 cm long and nearly orbicular blades, 3-8 cm (1-3 in) long, that are 3-5 times deeply divided and lobed into small wedge-shaped ultimate segments. The stem leaves are mostly short-petiolate and 3-lobed. The spreading, greenish sepals are much smaller than the 5 bright yellow petals, 10-14 mm long. The smooth achenes have a curved beak about 0.5 mm long.

This introduced species is common in the same habitats as the similar R. *acriiformis*. It is becoming a serious pest of irrigated hay meadows in the Bitterroot Valley. Widely established in the west and many other parts of the U.S.

13. Ranunculus *macounii* Britt.

Macoun's Buttercup

Macoun's buttercup is a stout, densely long-hairy perennial with 1-several stems, 20-75 cm (8-38 in) tall, that are erect or curved upward at the base and sometimes root at the nodes. The basal leaves are up to 30 cm (12 in) long with a long petiole and blades that are divided into 3 deeply lobed and toothed leaflets. The petals are 4-7 mm long, slightly longer than the reflexed sepals. The smooth, glabrous achenes have a nearly straight, triangular beak, 1-1.5 mm long, and are borne in a globose cluster.

This plant typically occurs in wet soil adjacent to ditches, ponds, and streams. It is widespread but does not occur in large populations. AK to CA, east to Lab., MI, and NM.

14. Ranunculus *abortivus* L.

Kidney-leaved Buttercup

Kidney-leaved buttercup is a biennial or short-lived perennial with fibrous roots and mostly single, erect stems that are branched above and 20-60 cm (8-24 in) tall. Basal leaves have long petioles and broadly spade-shaped and bluntly toothed blades, 1-4 cm long. The stem leaves, deeply divided into 2-3(5) narrow segments, have short petioles or are sessile. The 5 petals are up to 4 mm long, smaller than the yellowish green, reflexed sepals. Both petals and sepals fall soon after the flower opens. The smooth achenes have a minute beak and are borne in a cone-shaped cluster.

This species is common in forest openings, at the edges of moist woodlands, and among shrubs along streams in the valley and montane zones. AK to Lab., south to WA, TX, and FL; Cuba.

15. Ranunculus *uncinatus* D. Don

Little Buttercup

This perennial herb has slender, erect stems, 20-70 cm (8-28 in) tall, and coarse, fibrous roots. The basal leaves have petioles up to 20 cm (8 in) long and spade-shaped blades deeply divided into 3-5 sharply toothed lobes. Stem leaves have shorter petioles and narrower leaf segments. The inconspicuous flowers are borne in a leafy-bracted, open inflorescence. The 5 petals are 2-3 mm long, slightly longer than the early-falling sepals. The smooth achenes with keeled margins and hooked beaks, 1-2 mm long, are borne in a globose head.



y. *Ranunculus subrigidus* z. *R. flammula* a. *R. cymbalaria* b. *R. gmelinii* c. *R. sceleratus* d. *D. flabellaris*
e. *Ranunculus natans*



f. *Ranunculus acriformis* g. *R. acris* h. *R. macounii* i. *R. abortivus* j. *R. uncinatus*

The plant is widespread in forest openings, at the edges of moist woodlands, and among shrubs along streams. AK to CA, east to MT and NM.

16. Ranunculus pensylvanicus L.

Bristly Buttercup

Bristly buttercup is an annual or perennial with erect stems, 30-60 cm (12-24 in) tall, that are branched near or above the middle. The basal leaves, which wither as the plant matures, have long petioles and heart-shaped blades 5-10 cm (2-4 in) long. These are divided into 3 petiolate leaflets, each of which is again divided into 3 sharply lobed segments. The stem leaves are similar and gradually reduced upward. Herbage is covered with long, spreading hairs. Flowers are borne in an open, leafy-bracted inflorescence. The 5 reflexed sepals are 4-6 mm long, twice as long as the petals. The smooth achenes have a stout, straight beak, 0.5-1 mm long, and are borne in an egg-shaped to short cylindrical cluster.

This species has been collected in moist meadows in the floodplain of the Bitterroot River. AK to Newf., south to WA, NM, and NJ; Asia.

17. Ranunculus orthorhynchus Hook.

Straightbeak Buttercup

A sparsely to densely hairy perennial, straightbeak buttercup usually has fibrous roots and several stems, 20-60 cm (8-16 in) tall, that are erect or prostrate at the base. The basal leaves, up to 25 cm (10 in) long, have thick petioles and blades that are pinnately divided into 3-5(7) deeply lobed and coarsely toothed segments. Stem leaves are more deeply divided into linear segments. The reflexed sepals are often tinged with purple and fall soon after the flowers open. The 6-7 petals are 9-18 mm long. The smooth achenes have a prominent, nearly straight beak, 2-4 mm long.

Our plants are var. platyphyllus Gray. The only collection of this plant is from the Lolo Creek Valley. AK to CA, east to MT, WY, and UT.

Group V. Members of this group are all perennials of moist habitats from the montane to alpine zone. Flowers are yellow.

18. Ranunculus eschscholtzii Schlecht

Subalpine Buttercup

Subalpine buttercup has 1-several, mostly simple stems, 8-20 cm (3-8 in) tall, from a stout root crown sheathed in old leaf bases. Basal leaves have long petioles and spade-shaped to nearly orbicular blades divided into 3 lobes that are entire to 1-2 times lobed or toothed. Usually the only stem leaf subtends the 1- to 3-flowered inflorescence. The 5 glabrous to hairy sepals are mostly purplish-tinged. The yellow petals are 7-15 mm long. The glabrous achenes have a slender, straight beak about 1-1.5 mm long and are borne in an egg-shaped to cylindrical cluster.

Leaves of var. suksdorfii (Gray) Benson have pointed lobes. This variety is much more common than var. eschscholtzii which has rounded lobes, but the two intergrade freely in our area. This species is common from subalpine to timberline zones in all Montana mountain ranges, especially the Bitterroot Mountains. AK to CA, east to Alta. and NM.

Subalpine buttercup often forms large, dense colonies below late-melting snowdrifts.

19. Ranunculus populago Greene

Mountain Buttercup

This species has glabrous foliage, fibrous roots, and 1-several erect or lax stems, 10-30 cm (4-8 in) long, that are often branched above. The basal leaves have long, slender petioles and spade-shaped to nearly orbicular blades, 2-5 cm (1-2 in) long, with finely toothed margins. The stem leaves have short petioles and are nearly opposite in the open inflorescence. The deep yellow petals are 4-7 mm long, about twice as long as the spreading, light yellowish sepals. The glabrous achenes have a slightly curved beak less than 1 mm long and are borne in a hemispheric head.

Throughout our area mountain buttercup is locally abundant in moist to wet montane to subalpine meadows, such as along the Elk Meadows Road southwest of Lolo. Central OR to CA, east to MT and ID.

20. Ranunculus alismaefolius Geyer

Plantain-leaved Buttercup

Plantain-leaved buttercup has slightly fleshy roots and 1-several, usually branched stems 10-25 cm (4-10 in) tall. The basal leaves have long petioles and lance-shaped blades up to 15 cm (6 in) long with entire to shallowly toothed margins. Stem leaves are lance-shaped and nearly sessile. The petals, 5-10 mm long, are twice as long as the reflexed sepals. The glabrous achenes have a straight beak, about 1 mm long, that projects out at a right angle. They are borne in a nearly globose cluster.

Var. alismellus Gray has glabrous foliage, while var. davisii Benson has hair on the petioles and flower stalks. Both varieties are infrequent in the subalpine zone. Throughout sw. Can. and w. U.S.

21. Ranunculus inamoenus Greene

Unlovely Buttercup

This perennial has fibrous roots and 1-few erect, hollow stems, 10-30 cm (4-12 in) tall, that are simple or branched above. The basal leaves are petiolate with fleshy blades that are egg-shaped to fan-shaped and 2-4 cm long with shallow, rounded lobes or teeth on the margins towards the tip. The stem leaves are more deeply lobed and nearly sessile. Herbage is glabrous to sparsely hairy. The 5 petals are

2-8 mm long, equal to or longer than the spreading or reflexed sepals. The glabrous or hairy achenes have a straight beak, nearly 1 mm long, and slightly hooked at the tip. They are borne in a short-cylindrical head.

Unlovely buttercup is known from moist to wet meadows along streams in the montane and subalpine zone of the Sapphire Range. B.C. to WA and NV, east to Alta., CO, and AZ.

22. Ranunculus pygmaeus Wahlenb.

Dwarf Buttercup

This is a dwarf, glabrous perennial with stems, 1-6 cm (1-2 in) tall, that are erect or prostrate at the base. The basal leaves have long, slender petioles and nearly orbicular to spade-shaped blades, 5-11 mm wide, that are divided into 3-5 rounded lobes. The bracts below the usually solitary flower have 3 nearly linear lobes. The 5 petals are 1-3 mm long, about equal to the greenish, spreading sepals. The glabrous achenes with a nearly straight beak 0.5 mm long are borne in an egg-shaped head.

In our area, dwarf buttercup is known only from 2775 m (9,100 ft) on "Bedrock Mtn." above Chaffin Lakes in the southern Bitterroot Mountains. Arctic-alpine, AK to Greenl., south to MT, WY, and CO; Eurasia.

Group IV. These are 2 introduced weeds of gardens and disturbed ground in the valleys.

23. Ranunculus repens L.

Creeping Buttercup

Creeping buttercup is a perennial with simple or branched, mostly prostrate stems, up to 1 m (3 ft) long, that root at the nodes. The basal leaves have petioles up to 15 cm (6 in) long and blades with 3 leaflets that are twice 3-5 lobed into wedge-shaped segments. The stem leaves are gradually reduced to sessile, deeply lobed bracts. Herbage is sparsely to densely hairy. The yellow petals are 7-17 mm long, about twice as long as the sepals. The glabrous achenes with hooked beaks about 1 mm long are borne in an egg-shaped head.

This is an obnoxious lawn and garden weed with a cosmopolitan distribution. The showy var. pleniflorus Fern., with 10-numerous petals, has been intentionally introduced into many gardens with years of regret afterwards.

24. Ranunculus testiculatus Crantz

Hornseed Buttercup

This small annual has hairy foliage and unbranched, erect, leafless stems, 3-7 cm (1-3 in) tall. The basal leaves have slightly winged petioles and blades that are divided into 3-5 broadly linear segments. The solitary flowers have 5 petals, 4-6 mm long, and slightly smaller, persistent, green sepals. The densely short-hairy achenes have a lobed body, about 2 mm long, projecting into a straight, daggerlike beak 3-4 mm long. They are borne in a short-cylindrical head.

Hornseed buttercup occurs on disturbed ground along roads and highways around Missoula. Introduced from Eurasia into much of w. U.S.

This species became quite common after being introduced into our area in the 1970's. During the past 10 years it has become locally extinct in many places and is now much less common.

Thalictrum L. Meadowrue

Members of this genus are rhizomatous, perennial herbs with erect stems and small unisexual or bisexual, stalked flowers in a narrow to open inflorescence. The alternate leaves are 2-4 times branched into ultimate leaflets that are petiolate and shallowly lobed or toothed (resembling leaves of columbine). Petals are lacking, and the 4-5 sepals fall soon after opening. There are numerous, often showy stamens with filiform or claw-shaped anther stalks. The fruit is a ridged or nerved achene with a persistent style (beak).

Mature achenes are important for identification.

1. Flowers bisexual.....(3) T. sparsiflorum
1. Male and female flowers on separate plants.....2
2. Stem leaves without a petiole or nearly so, stalks of the primary divisions converging at the stem; margins of leaflets usually rolled under.....(2) T. dasycarpum
2. Stem leaves with a petiole; margins of leaflets usually not rolled under.....3
3. Achenes spreading to reflexed; stigma purplish; female inflorescence narrow, open and leafy-bracted.....(1) T. occidentale
3. Achenes erect or nearly so; stigmas not purple; female inflorescence more rounded and congested with only a few inconspicuous bracts.....(4) T. venulosum

1. Thalictrum occidentale Gray

Western Meadowrue

Western meadowrue is glabrous to glandular-hairy with stems that are 20-90 cm (8-35 in) tall. Stem leaves are 3-4 times branched into fan-shaped leaflets that are 3-lobed with coarse, rounded teeth. The male and female flowers are on separate plants. The leafy bracted inflorescence is narrow and sparingly



o. *Ranunculus alismaefolius* p. *R. inamoenus* q. *R. pygmaeus* r. *R. repens* s. *R. testiculatus*

branched. Anther filaments are threadlike and usually purplish. The spindle-shaped achenes are 5-8 mm long, 3-nerved on each face, and spreading to reflexed at maturity.

Western meadowrue is common in more-or-less shaded, moist but well-drained habitats from the valleys to the upper subalpine zone. B.C. to CA, east to Alta., WY, and CO.

2. Thalictrum dasycarpum Fisch. & Ave-Lall.

Tall Meadowrue

This plant has stout, leafy stems, 60-180 cm (2-6 ft) tall, that branch toward the top. The sessile leaves are 3-5 times branched into fleshy leaflets shaped like duck's feet with their edges rolled under. The leafy-bracted inflorescence is open and moderately branched. Male and female flowers are on separate plants. There are usually just 4 sepals. The white or yellowish anther filaments are slightly claw-shaped. The glabrous or pubescent, narrowly lance-shaped achenes are about 4 mm long with 6-8 thick ribs.

Tall meadowrue is locally common in moist or wet meadows or among willows along sloughs, ditches, and ponds in the Bitterroot Valley from Lolo south to Darby. B.C. to Ont., south to LA, TX, AZ, and WA.

This plant is poisonous to cattle.

3. Thalictrum sparsiflorum Turcz.

Few-flowered Meadowrue

Few-flowered meadowrue has sturdy stems, 20-80 cm (8-32 in) tall, that are branched above. Leaves are 2-3 times branched into fan-shaped leaflets with rounded lobes. The leaflets are green and glabrous above, pale and glandular-hairy beneath. The leafy-bracted inflorescence is open and moderately branched with few flowers per branchlet. The bisexual flowers have whitish anther filaments. The compressed, minutely glandular achenes are nearly elliptical with 3-4 nerves per face.

Uncommon beneath willows or alders at forest margins or in moist, non-acidic meadows along streams. It is not known from west of the Bitterroot River but was collected east of the river and at Gibbon's Pass. AK to CA, east to Alta. MT, and CO; Siberia.

This plant has a sturdier stem but smaller leaflets than T. occidentale.

4. Thalictrum venulosum Trel.

Veiny Meadowrue

Veiny meadowrue has stems, 20-50 cm (8-20 in) tall, that are branched above. The leaves are 2-4 times branched into fan-shaped, glabrous and often waxy leaflets that are prominently veined beneath and have rounded teeth on the margins. The inflorescence is branched but relatively congested with a few inconspicuous bracts. Male and female flowers are on separate plants. The nearly erect, glabrous achenes are narrowly elliptical with 3-5 thick ribs on each face.

In our area veiny meadowrue is known only from a moist meadow near Gibbon's Pass. B.C. to OR, east to Que., MN, and WY.

Trautvetteria Fisch. & Mey. False Bugbane

Trautvetteria carolinensis (Walt.) Vail

False Bugbane

False bugbane is a herbaceous perennial with 1-several stems, 30-100 cm (1-3 ft) tall, from widely spreading rhizomes. The mostly basal leaves have long petioles and blades, 10-25 cm (4-10 in) wide, that are deeply, palmately divided into 5-10 coarsely sharp-toothed lobes. The stem leaves are smaller and nearly sessile. Herbage is glabrous below but short-hairy toward the top. The stems are branched above to form a nearly flat-topped inflorescence. The bisexual, cream-colored flowers lack true petals but have 5 petal-like sepals that are 3-5 mm long. The numerous anthers have club-shaped stalks. The elliptical achenes, 3-4 mm long, have a hooked beak and are borne in a globose cluster.

This species occurs in moist forest with western red cedar and grand fir. It is known from the Lolo Creek drainage. Widespread in North America and Japan.

Trollius L. Globeflower

Trollius laxus Salisb.

American Globeflower

Globeflower is a glabrous, herbaceous perennial with fibrous roots and erect stems 20-50 cm (8-20 in) tall. The mostly basal leaves have long petioles and blades that are palmately divided into 5 deeply cleft and toothed lobes. The 2-3 stem leaves are sessile or short-petiolate. The showy, cream-colored to white flowers are solitary at the ends of the stems. Petals are lacking, but the 5 (to 10) petal-like sepals are 10-20 mm long with a small spoon-shaped sterile stamen at the base of each. Stamens are numerous. The fruit is a cluster of dry, 1-celled capsules (follicles), each containing many seeds.

This predominantly subalpine plant is common in openings of moist spruce-fir forests but also occurs in wet meadows and along lakes and streams up to timberline. B.C. across s. Can., south to WA, CO, and CT.

RHAMNACEAE Buckthorn Family

Our representatives of this family include evergreen, or deciduous shrubs or small trees with simple, alternate, or opposite leaves. Leaves have small appendages at the base of the petiole (stipules). The small, radially symmetrical flowers are bisexual or unisexual; the calyx is 5(4)-lobed, and the corolla has



t. *Thalictrum occidentale* u. *T. dasycarpum* v. *T. sparsiflorum* w. *T. venulosum*

5(4) petals that often are clawed and have a hooded blade. The stamens are borne opposite the petals at the outer edge of a disc structure. Fruits are dry capsules or berrylike drupes.

1. Leaves with 3 prominent veins running from common origin at base to leaf margins (palmately veined), fruit is a capsule.....Ceanothus
1. Leaves with a prominent midrib and the other prominent veins lateral and ascending from all along the midrib; fruit is a berry.....Rhamnus

Ceanothus L. Buckbrush, Ceanothus

Ceanothus velutinus Dougl.

Evergreen or Shiny-leaf Ceanothus

In our area, shiny-leaf ceanothus is a spreading, mid-sized shrub, usually not much taller than 1 m (40 in). Twigs are yellowish-green and the roots have small, hard knots (nodules) encapsulating nitrogen-fixing bacteria. The egg-shaped to elliptical leaves, with 3 prominent veins originating at the base, are smooth, sticky, and shining on the upper surface and grayish-hairy on the lower surface. The small, greenish or yellowish-white and odoriferous flowers are arranged in large, dense clusters.

This shrub occurs on open and dry montane slopes, often south- or west-facing. Dense stands often develop following a hot burn when seed stored in the soil for up to 200 years is stimulated to germinate. With the development of tree cover, this species is soon shaded out. Attempts to transplant have never been successful. When exposed to a warming sun, the resinous foliage of the sometimes extensive stands perfumes the air with a sickly-sweet smell. It is a valuable browse species for deer and elk. From coastal B.C. to CA, east, mostly in the mountains, to SD and CO.

Rhamnus L. Buckthorn

Our members of this genus include shrubs and small trees. Corollas are greenish-yellow and 4- or 5-parted or lacking.

1. Leaves opposite or nearly so; 3-5 pairs of prominent lateral leaf veins.....(2) R. cathartica
1. Leaves alternate; 6 or more pairs of lateral leaf veins.....(1) R. alnifolia

1. Rhamnus alnifolia L'Her

Alder Buckthorn

The stems of this deciduous shrub are decumbent to erect and 0.5-1.5 m (20-60 in) tall. The alternate leaves have oblong egg-shaped to oblong-elliptical blades with prominent, sunken veins and stipules 3-6 mm long. Male and female flowers are borne on separate plants in axillary umbrellalike inflorescences. They are small, inconspicuous and lack petals. Only a few flowers per umbel survive to become blue-black, 3-seeded berries 6-8 mm long.

This species occurs in meadows, near lakes, rivers and streams and in vernal wet sites that can become quite dry by fall. The berries are not palatable to humans, but are consumed by birds. From B.C. to northeastern North America and on the east side of the Cascades south to central Sierra Nevada of CA and ID, MT, and WY.

2. Rhamnus cathartica L.

Common European Buckthorn

A small tree of European origin sometimes planted in parks. One young, fruiting tree, probably planted by birds, grows on an island in the Clark Fork River bordering the University of Montana. (Not illustrated).

ROSACEAE Rose Family

The large family contains perennial, biennial, and annual herbs and shrubs and trees, sometimes with thorny stems. The evergreen or deciduous leaves are mostly alternate on the stems and simple or compound. The mostly bisexual flowers are radially symmetrical with 5 separate petals (sometimes lacking) and 5 sepals united below with the ovary to form a hypanthium. Numerous stamens are borne around the edge of the calyx tube. The fruit may be an achene, a many-chambered capsule, a fleshy fruit with numerous seeds imbedded in it (drupe), or a fleshy fruit with seeds contained in the center (pome).

1. Plants woody-stemmed trees or shrubs, not mat-forming.....2
1. Plants herbaceous or if woody at the base then mat-forming.....16
2. Leaves divided into distinct leaflets.....3
2. Leaves with lobed, toothed, or entire margins but not divided into leaflets.....6
3. Stems spiny or prickly, sometimes only sparsely so.....4
3. Stems without spines or prickles.....5
4. Petals white; fruit a raspberry or blackberry; leaflets usually 3.....Rubus
4. Petals pink to red, fruit a rose hip, leaflets >3.....Rosa



x. *Trautvetteria carolinensis* y. *Trollius laxus* z. *Ceanothus velutinus* a. *Rhamnus alnifolia*

5. Leaves with 3-5 leaflets.....Potentilla fruticosa
5. Leaves with >7 leaflets.....Sorbus
6. Leaves lobed at least 1/3 the way to the midvein.....7
6. Leaves entire or merely toothed on the margin, cleft less than 1/3 the way to the midvein.....10
7. Leaves entire except for 3 lobes at the tip.....Purshia
7. Leaves not as above.....8
8. Flowers small, >>30 in a congested, pyramid-shaped inflorescence; leaves not resembling a maple leaf.....Holodiscus
8. Flowers <30 in a rounded or open inflorescence; leaves somewhat resembling a maple leaf.....9
9. Most leaves >7 cm (3 in) long; petals >1 cm long.....Rubus parviflorus
9. Most leaves <7 cm long; petals <1 cm long.....Physocarpus
10. Leaves evergreen and entire-margined.....Cercocarpus
10. Leaves deciduous, mostly with toothed margins.....11
11. Branches with spines or thorns.....12
11. Branches lacking spines or thorns.....13
12. Branches with spines at the ends.....Prunus americana
12. Straight or somewhat curved thorns along the branches.....Crataegus
13. Inflorescence with >>30 small flowers in a greatly branched, congested, elongated, or flat-topped inflorescence.....Spiraea
13. Inflorescence with <30 flowers.....14
14. Leaves with teeth only on the upper half.....Amelanchier
14. Leaves toothed to the base or nearly so.....15
15. Fruit (apple) many-seeded and mostly >3 cm (1 in) long; near towns, farms or roads.....Pyrus
15. Fruit (cherry, plum) 1-seeded, <3 cm long; often in native plant communities.....Prunus
16. Leaves not deeply lobed or divided.....17
16. Leaves lobed at least 1/2 way to midvein or divided into leaflets.....18
17. Leaves with wavy-toothed margins, sometimes turned under; flowers large and solitary.....Dryas
17. Leaves with entire margins; flowers small, in a compact, elongated inflorescence.....Petrophytum
18. Leaves divided into 3 distinct leaflets, these mostly elliptical to narrowly egg-shaped.....19
18. Leaves deeply lobed or divided into >3 leaflets.....21
19. Flowering stems with at least 1 3-parted leaf.....Potentilla
19. Flowering stems without leaves, small undivided bracts may be present in inflorescence.....20
20. Petals pale yellow and smaller than the sepals; plants near or above timberline.....Sibbaldia
20. Petals white and longer than the sepals; plants mostly well below timberline.....Fragaria
21. Leaves palmately divided into 3 deeply divided lobes, resembling a bird's foot.....Luetkea
21. Leaves palmately or pinnately divided into >3 leaflets.....22
22. Sepals 4; petals lacking.....Sibbaldia
22. Sepals at least 5 on most flowers.....23
23. Base of leaflets attached at a single point or nearly so (palmate).....Potentilla
23. Leaflets attached along an axis (pinnately divided).....24
24. Stamens 5.....Ivesia
24. Stamens at least 10.....25
25. Ovary and fruits (achenes) hairy.....Geum
25. Ovary and fruits glabrous or nearly so.....Potentilla

Amelanchier Medic. ServiceberryAmelanchier alnifolia Nutt.

Serviceberry, Saskatoon

Serviceberry is a tall deciduous shrub or occasionally small tree, 1-5 m (3-16 ft) tall, often sprouting from subsurface shoots. The bark is grayish, and the twigs are reddish-brown with hairy buds.

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The alternate, elliptical leaves, 2-5 cm long, are rounded at both ends, and glabrous to hairy with toothed margins toward the tip and entire margins below. The 2-several stalked flowers are borne in short, open inflorescences at the ends of leafy side branches. The 5 lance-shaped petals are 6-15 mm long, and the sepals are spreading or recurved. The ovary is glabrous or woolly-hairy on top where the sepals become united. The bluish-purple, berrylike fruit is 10-14 mm long and covered with a waxy coating. It has 2 seeds at the center and is sweet and juicy.

Var. alnifolia, with the top of the ovary hairy and petals less than 12 mm long, is our most common form. Var. cusickii (Fern.) Hitchc., with a hairy ovary and petals more than 15 mm long, is common along rivers and streams, on rocky slopes and in open ponderosa pine and Douglas fir forests from the valleys to the subalpine. Var. pumila (Nutt.) A. Nels. has a nearly glabrous ovary and is infrequent in the valleys and foothills in the northern part of our area. AK to CA, east to Alta, SD, CO, and NM.

A small form of this species is found on grassy subalpine slopes, its dwarf stature due, at least in part, to browsing by deer. Birds, chipmunks, squirrels, and bears as well as people gather the berries.

Cercocarpus H.B.K. Mountain Mahogany

Cercocarpus ledifolius Nutt.

Mountain Mahogany

This densely branched evergreen shrub or small tree has gray, furrowed bark and is up to 6 m (20 ft) tall. The leaves have short petioles and leathery, narrowly lance-shaped blades, 1-3 cm long and slightly resinous. They have inrolled, entire margins and are dull green and sparsely hairy to glabrous and shiny above and light gray-woolly below. The 1-3 inconspicuous flowers are borne at the tips of short side branches. The tubular calyx, 4-7 mm long, surrounds the ovary and has 5 lobes at the top. There are no petals, but there are numerous stamens borne at the top of the calyx tube. The fruit is an achene with a long, twisted, bristly style.

Mountain mahogany is the dominant shrub in some areas north of the Skalkaho Road, southeast of Hamilton and along the West Fork of the Bitterroot River, southwest of Darby. It reaches an elevation of 2195 m (7,200 ft) at the top of a spectacular 610 m (2,000 ft) granitic cliff along the trail to Trapper Peak. This species does not tolerate dense shade. It is intensely grazed by mule deer causing it to assume a twisted and gnarled shape. Our plants are var. intercedens Schneid. WA to CA, east to MT, CO, and AZ.

Crataegus L. Hawthorne

These large, deciduous shrubs or small trees have branches bearing remotely spaced, stout, straight, or curved thorns. The simple, petiolate leaves are alternate and toothed or lobed. Stalked flowers are borne in open, nearly flat-topped inflorescences borne in the axils of leaves or on short side branches. Flowers are bisexual with white petals and up to 25 stamens. Sepals are united around the inferior ovary. The berrylike fruit has 2-5 seeds in the center.

1. Leaves deeply pinnately lobed; fruit with 1 seed; introduced and rare.....(3) C. monogyna
1. Leaves shallowly lobed only in the upper portion; fruit with 2-5 seeds; native species.....2
2. Thorns 1-2(3) cm long; fruit black.....(1) C. douglasii
2. Thorns mostly 4-7 cm long; fruit red.....(2) C. columbiana

1. Crataegus douglasii Lindl.

River Hawthorn

River hawthorn is a large shrub, usually up to 5 m (16 ft) tall, with glabrous twigs that have straight to slightly curved thorns less than 2 cm (1 in) long. The narrowly fan-shaped leaf blades, 3-6 cm (1-2 in) long, are widest above the middle, coarsely toothed, and sharply lobed above. Petals are 5-7 mm long. The globose fruit is purplish-black.

This hawthorn is common along river bottoms and in the lower mountain canyons as well as in meadows and forest borders in the valleys and foothills. AK to CA, east to Ont., MI, and SD.

The berries of this species are little used by birds; cedar waxwings and fox sparrows are the only regular visitors. These shrubs are used more for nesting and cover. They are a common home for magpie nests that add to their rugged appearance in the winter.

2. Crataegus columbiana Howell

Columbia Hawthorn

This large shrub or small tree, up to 4 m (13 ft) tall, has branches armed with slender, straight, or slightly curved spines 4-7 cm (2-3 in) long. The bark is reddish, and the young twigs are covered with woolly hair. Leaves have short petioles and elliptical blades, 2-6 cm (1-2 in) long, that are coarsely toothed or sharply lobed on the upper portion. Petals are 5-8 mm long. The fruit is bright to dark red and forms showy clusters.

Columbia hawthorn occurs along rivers and streams and is known only from along the Clark Fork River and Pattee Canyon near Missoula. B.C. to Alta., south to OR, ID, and MT.

3. Crataegus monogyna Jacq.

White Hawthorn

White hawthorn is a shrub up to 10 m (32 ft) tall with dark thorns up to 2 cm long. Leaf blades are wedge-shaped and pinnately divided into 3-7 few-toothed lobes. The elliptical fruit is up to 1 cm long and has 1 seed.

Specimens of this European hawthorn occur along the Clark Fork River and Miller Creek in the Missoula area. Introduced into much of the U.S., particularly in the east. (Not illustrated).

Dryas L. Mountain Avens, DryadDryas octopetala L.

Mountain Avens

Mountain avens is a low-growing, mat-forming subshrub with old, brown leaf bases on the lower stems. Leaves have slender petioles and alternate, lance-shaped blades, 1-2 cm long, that are dark green and minutely glandular above and densely white-hairy beneath with wavy, inrolled margins. The beautiful flowers are solitary on naked stems up to 10 cm (4 in) long. They have 8(10) sepals and white to cream-colored petals and numerous styles and stamens. The styles remain on the achenes, elongating and becoming plumelike at maturity.

Our plants are var. angustifolia Hitchc. This plant occurs at or above timberline. It is known from 10 alpine summits in the Bitterroot Mountains between 2575 m (8,450 ft) and 2745 m (9,000 ft). The most extensive occurrence is on St. Joseph's Peak, west of Florence. Circumpolar, south in w. U.S. to OR, ID, and CO.

Mountain avens is a source of lore and the object of superstition in the old world.

Fragaria L. Strawberry

These are perennial herbs with short, scaly rootstocks, long runners (stolons) that root at the nodes, and leaves clustered at the base of the stems. The leaves have long petioles with small, winglike appendages at the base (stipules) and blades divided into 3 egg-shaped or elliptic, coarsely toothed leaflets. Few flowers are borne in an open inflorescence on a leafless stem that bears a few small bracts toward the top. The 5 sepals are united to the base of the ovaries and alternate with 5 small bracts. The 5 white petals are nearly round, and there are numerous styles and stamens. The fruit is berrylike with numerous achenes imbedded in the sweet, juicy flesh.

Both of our species flower profusely but seldom bear enough fruit to make picking worthwhile. Both are most common in moist, humus-rich, well-drained soil of open forest and forest margins from the valleys to the lower subalpine zone.

1. Leaves yellow-green, upper surface bulged between the veins; apical tooth of the leaflets greater than those on either side.....(2) F. vesca
2. Leaves blue-green; apical tooth of leaflets smaller than those on either side.....(1) F. virginiana

1. Fragaria virginiana Duchesne

Blueleaf or Virginia Strawberry

Plants have leaves with petioles up to 15 cm (6 in) long and slightly bluish leaflets, 2-7 cm (1-3 in) long, that are wedge-shaped at the base and coarsely toothed above the middle. The flowering stems are usually shorter than some of the leaves. The fruit is hemispherical.

Var. platypetala (Rydb.) Hall is covered with spreading hairs and has petals 8-10 mm long. It is more common than var. glauca Wats., which is distinguished by being less hairy with a more noticeable thin, waxy coating on the leaves and petals. The latter variety becomes more common at higher elevations in the southern part of our area. Much of s. Can. and the U.S.

2. Fragaria vesca L.

Woods Strawberry

Woods strawberry has light, yellow-green leaflets that are coarsely toothed nearly to the base. The leafless flowering stem often has a large bract and is usually longer than the leaves. The fruit is egg-shaped and narrowed at the base.

Our plants are var. bracteata (Heller) Davis. Circumboreal, throughout much of North America.

Geum L. Avens

Members of this genus are perennial herbs with stout rootstocks and erect or ascending stems, simple or branched above. The mostly basal leaves are pinnately divided, while the stem leaves are small and less divided. Flowers are solitary or borne in an open, few-flowered inflorescence. The bell- or saucer-shaped calyx has 5 lobes that alternate with small bracts. There are 5 petals and numerous stamens and styles. The fruit is an achene, tipped by the elongated, plumose, often jointed style.

1. Stem leaves, at least lower ones, not much smaller than basal leaves.....2
1. Stem leaves few and greatly reduced.....4



b. *Amelanchier alnifolia* c. *Cercocarpus ledifolius* d. *Crataegus douglasii* e. *C. columbiana*
 f. *Dryas octopetala* g. *Fragaria virginiana* h. *F. vesca*

2. Flowers with erect, purplish sepals and mostly pinkish petals.....(2) G. rivale
2. Flowers with spreading sepals and yellow petals.....3
3. Terminal leaflet much larger than the two below it; lower segment of style with glandular hairs.....(1) G. macrophyllum
3. Terminal leaflet not much larger than the two below it; lower style segment without glands.....(3) G. aleppicum
4. Petals erect, pinkish to cream-colored; styles elongated and featherlike; subalpine and lower.....(4) G. triflorum
4. Petals yellow and spreading; styles glabrous and short; timberline and above.....(5) G. rossii

Group I. These species occur in moist to wet meadows, along streams, or in partial shade of thickets and open forests.

1. Geum macrophyllum Willd.

Large-leaved Avens

This is a coarse plant with hairy foliage and erect stems, mostly 30-70 cm (12-28 in) tall. Basal leaves are up to 30 cm (12 in) long with a large, broadly spade-shaped, coarsely toothed, and lobed terminal leaflet and numerous much smaller, broadly lance-shaped ones arranged in pairs below it. The 3-5 stem leaves are smaller and less divided. Flowers are borne in an open, branched inflorescence. The yellow petals are 4-6 mm long, and the sepals are reflexed. The compressed achenes have an abruptly bent style that is minutely glandular-hairy with a featherlike tip.

Large-leaved avens is common in the valley and montane zones, becoming infrequent in the subalpine. AK to Mex., east to N.S. and the Great Lakes; Asia.

2. Geum rivale L.

Water Avens

Water avens has slender stems, 25-70 cm (10-28 in) tall, that are simple or branched above. The basal leaves, up to 30 cm (12 in) long, have 3 large, lobed, and coarsely toothed leaflets above many smaller, narrower ones. Stem leaves are smaller. Few to several nodding flowers are borne in an open inflorescence. The erect, brownish-purple or yellowish sepals are slightly longer than the flesh-colored to yellowish and purple-veined petals. The numerous achenes have jointed styles with a featherlike upper portion and a sparsely, long- and short-hairy lower segment.

This species is infrequent in wet, often boggy meadows, such as those along the Bitterroot River south of Lolo. It occurs from the valleys up to the subalpine zone. Circumboreal, south to WA, NM, MO, and NJ.

3. Geum aleppicum Jacq.

Yellow Avens

Yellow avens is a coarse herb, similar to G. macrophyllum, with stems up to 80 cm (32 in) tall. The basal leaves have long petioles and a large, deeply lobed and coarsely toothed, wedge-shaped terminal leaflet with pairs of egg-shaped and progressively smaller leaflets below it. Stem leaves are smaller with fewer leaflets. The foliage is evidently hairy. Few, erect flowers are borne in the open inflorescence. The spreading, yellow petals are slightly longer than the reflexed sepals. The elongated styles are bent with a featherlike upper portion and a glabrous lower segment.

This species is uncommon in our area. Circumboreal, south to CA, NM, and ne. U.S.

Group II. These two species occur in drier habitats, such as open ponderosa pine forests, dry meadows, open slopes, and alpine tundra.

4. Geum triflorum Pursh

Prairie Smoke, Old Man's Whiskers

This species has soft-hairy foliage and stems up to 30 cm (12 in) tall from a coarse rootstock that bears old leaf bases at the top. Basal leaves have blades, up to 15 cm (6 in) long, that are pinnately divided into many crowded, coarsely toothed, narrowly wedge-shaped leaflets. The 1-2 stem leaves are small and pinnately divided into narrow lobes. The 1-5 (usually 3), often nodding flowers occur in an open, bracteate inflorescence. The cup-shaped calyx is reddish-purple with lobes shorter than the narrow bracts arising between them. The erect petals are pinkish or yellowish and slightly longer than the sepals. The achenes have a straight style, 6-12 mm long, that is featherlike with a short glabrous portion at the tip.

Prairie smoke is common in grasslands and open forests in the foothills but can also be found in grassy balds at subalpine elevations. Our plants are var. ciliatum (Pursh) Fassett. B.C. to CA, east to Newf., NY, NE, and NM.

5. Geum rossii (R.Br.) Ser.

Ross' Avens

[Geum turbinatum Rydb.]

Ross' avens has erect, slender stems, 5-25 cm (2-10 in) tall, from sturdy rootstocks covered with old leaf bases at the top. The glabrous to silvery hairy leaves have short petioles and oblong blades, 3-10 cm (1-4 in) long, pinnately divided into numerous, wedge-shaped and lobed leaflets. Stem leaves are

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smaller and nearly sessile. The open inflorescence has 1-4 flowers. The bright yellow petals are 6-12 mm long. The achenes have glabrous styles that are straight and barely elongated.

Var. turbinatum has a conical calyx with purplish-brown lobes, petals 6-10 mm long, and mostly more than 1 flower in the inflorescence. The less common var. rossii has a bowl-shaped calyx with green lobes, longer petals, and mostly solitary flowers. These varieties intergrade in our area. They are common in meadows and on ridge tops above timberline. AK to OR, NV, AZ, and NM; Asia.

Ross' avens is one of the most common alpine flowers in the Bitterroot Mountains, often occurring in very large populations. The showiest display of this species occurs on the summit of Lolo Peak, where its yellow flowers blend with the blue of Campanula parryi.

Holodiscus Maxim. Ocean Spray

Holodiscus discolor (Pursh) Maxim.

Mountain Spray

Stems of this deciduous shrub are 1-3 m (3-10 ft) tall with slender, often arcing branches and grayish-red bark. The alternate leaves have shallowly lobed and toothed margins and are egg-shaped, rounded at the tip, and abruptly contracted to the petiole. They are green and sparsely hairy above, paler, densely hairy and sometimes glandular below. Numerous small flowers, 5 mm in diameter, are borne in clusters in a diffusely branched inflorescence. The 5 petals and 5 sepals are creamy white. There are 10 stamens and numerous pistils, and each flower produces dry achenes with persistent styles.

Mountain spray is common on rocky slopes and in open forests in the montane zone, especially in the southern Bitterroot Mountains. B.C. to CA, east to w. MT and ID.

This showy species is the last of our native shrubs to bloom, beginning in late June and continuing well into July.

Ivesia T. & G. Ivesia

Ivesia gordonii (Hook.) T. & G.

Ivesia

Ivesia is a low-growing perennial herb with erect or ascending, mostly leafless stems, 5-15 cm (2-6 in) tall and a stout, mostly branched rootcrown densely covered with old leaf bases. Basal leaves have short petioles and narrowly lance-shaped blades, up to 7 cm (3 in) long, pinnately divided into numerous, small, overlapping, deeply lobed leaflets. The foliage is glandular-hairy and sticky with a light odor. Flowers are borne in a terminal, crowded, nearly globose head. The yellowish, cone-shaped calyx has erect lobes. The yellow petals, about 3 mm long, are shorter than the sepals. Each flower bears 2-4 flattened achenes, about 2 mm long.

In our area this species occurs in stony soil of alpine slopes on St. Mary's, Ward, and Piquette mountains in the Bitterroot Mountains and on Johnson Peak in the Anaconda Range. WA to CA, east to MT, WY, and CO.

Luetkea Bong. Partridge-foot

Luetkea pectinata (Pursh) Kuntze

Partridge-foot

Partridge-foot is a rhizomatous subshrub that forms mats with evergreen leaves and erect, leafy stems, 5-15 cm (2-6 in) high. The glabrous leaves, crowded at the base of the flowering stems, have broadened petioles and fan-shaped blades divided into 3 deeply lobed segments and resembling a bird's foot. Stem leaves are similar and reduced upward. The short-stalked or sessile, bisexual flowers are borne in a congested inflorescence. The 5 white petals, 3-4 mm long, exceed the sepals. There are about 20 stamens and mostly 5 styles. The fruit is a several-seeded dry capsule.

Locally common in cool, moist habitats, often near melting snow, in the subalpine and timberline zones of the Bitterroot Mountains. The plant is more common in the north from Lolo Peak south to the headwaters of Lost Horse Creek, but occurs as far south as Chaffin Lakes Basin, west of Darby. It is often associated with Cassiope, Phyllodoce and Saxifraga tolmiei. AK to CA, east to Alta., w. MT, and ID.

Partridge-foot is sometimes mistaken for a member of the Saxifrage Family.

Petrophytum (Nutt.) Rydb. Rockmat

Petrophytum caespitosum (Nutt.) Rydb.

Rockmat

This evergreen subshrub has intricately branched, prostrate stems, covered in old leaf bases. It forms dense mats up to 60 cm (2 ft) across. The tufted basal leaves, 5-15 mm long, have short petioles and narrowly spoon-shaped, bluish-green blades. The erect flowering stems have several, small, linear leaves below the congested, cylindrical inflorescence. The small flowers have a cone-shaped calyx with 5 triangular lobes, about 1 mm long, and 5 creamy white petals, about as long as the sepals. Both the numerous stamens and 5 styles are longer than the petals. The fruit is a cluster of 5 1- or 2-seeded capsules.



i. *Geum macrophyllum* j. *G. rivale* k. *G. aleppicum* l. *G. triflorum* m. *G. rossii* n. *Holodiscus discolor*
o. *Ivesia gordonii* p. *Luetkea pectinata*

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Rockmat is locally common, rooting in crevices of granite or gneiss on perpendicular canyon walls with west or south exposures. It is known from 9 montane to alpine locations in the Bitterroot Mountains, from Bass Creek Canyon at 2315 m (7,600 ft) to Mt. Jerusalem at 2775 m (9,100 ft). OR to CA, east to MT, SD, NM, and TX.

Physocarpus Maxim. Ninebark

Physocarpus malvaceus (Greene) Kuntze

Ninebark

Ninebark is a deciduous shrub with nearly glabrous foliage, erect stems up to 2 m (6 ft) tall, and bark that peels back in lines along its axis. The alternate leaves have short petioles and spade-shaped blades, 3-6 cm (1-2 in) long, that are 3-lobed and coarsely toothed, green above, and paler beneath. The numerous, small, bisexual flowers are stalked and borne in a broadly hemispheric inflorescence. The cup-shaped calyx has 5 reflexed lobes and 5 white, spreading petals, about 4 mm long. There are 20-40 stamens and 2-3 styles. The fruit is an inflated 2- to 3-chambered capsule with 2-4 seeds per chamber.

This shrub is common on rocky slopes and in dry Douglas fir and ponderosa pine forests. It is prominent on open, grassy slopes above Missoula and in the Bitterroot Valley. B.C. to OR, east to Alta., WY, and UT.

Ninebark begins to turn color as early as late July, becoming brownish-red by early autumn.

Potentilla L. Cinquefoil

Cinquefoils are perennial, biennial, or annual herbs, and one shrub with alternate, mostly compound leaves that have membranous appendages (stipules) at the base of the petioles. The bisexual flowers are solitary or borne in branched, usually open inflorescences. The 5 separate petals are yellow, white, or, in one case, purple, and the 5 sepals have small bracts between them. There are numerous stamens and styles. The fruit is a cluster of achenes borne on the convex receptacle. The lower portion of the calyx is united to the receptacle.

1. Plants definitely shrubby.....(1) P. fruticosa
1. Plants herbaceous.....2
2. Plants with red runners bearing solitary, stalked flowers.....(12) P. anserina
2. Plants without solitary flowers borne on runners.....3
3. Flowers purple or deep red.....(11) P. palustris
3. Flowers white to yellow.....4
4. Lower leaves with leaflets all attached at the tip of the petiole or nearly so (palmate).....5
4. Lower leaves with leaflets distributed, usually in pairs, along the upper length of the petiole.....13
5. Most basal leaves with 3 leaflets.....6
5. Most basal leaves with 5-9 leaflets.....9
6. Plants perennial; subalpine to timberline.....(15) P. flabellifolia
6. Plants annual or biennial; valley or occasionally montane zones.....7
7. Lower stems with stiff, spreading hairs; petals at least 3/4 as long as sepals.....(4) P. norvegica
7. Lower stems with soft, often curved hairs; petals <3/4 as long as the sepals.....8
8. Calyx not glandular; lower stem leaves often with 5 leaflets.....(6) P. rivalis
8. Calyx glandular; lower stem leaves with 3 leaflets.....(5) P. biennis
9. Flowers <1 cm across the face; leaflets deep green above and white-hairy beneath.....(9) P. argentea
9. Flowers >1 cm across; leaflets lacking such a striking contrast between upper and lower surfaces....10
10. Plants low and spreading, <10 cm (4 in) high; leaves densely hairy beneath.....(16) P. concinna
10. Plants with erect stems, usually >15 cm (6 in) tall; leaves densely hairy beneath.....11
11. Plants upper montane to alpine.....(13) P. diversifolia
11. Plants of valleys and foothills.....12
12. Lower stems and petioles with stiff, spreading hairs; flowers light canary-yellow.....(7) P. recta
12. Hairs of lower stems and petioles not stiff and spreading; flowers deeper yellow.....(2) P. gracilis
13. Petals creamy white to pale yellow; styles attached below middle of ovary.....14
13. Petals bright yellow; styles attached above middle of ovary.....15
14. Inflorescence with mostly stiffly erect branches; sepals 6-8 mm at flowering.....(3) P. arguta
14. Inflorescence with spreading branches; sepals usually <6 mm long.....(14) P. glandulosa

15. Winglike appendages at the base of the petiole (stipules) undivided; styles not thickened or warty at the base.....(10) P. hippiana
 15. Stipules deeply divided; styles swollen and warty at the base.....(8) P. pensylvanica

Group I. This group contains the only shrub in the genus.

1. Potentilla fruticosa L.
 [Pentaphylloides floribunda (Pursh) Love]

Shrubby Cinquefoil

Shrubby cinquefoil has spreading to erect stems up to 1.5 m (5 ft) tall with reddish brown, shredding bark and hairy young twigs. Leaves are pinnately divided into 5 (3-7) narrowly elliptic, entire segments that are pale green and sparsely hairy above and densely silky-hairy and whitish below. The 1-few flowers are borne at the ends of branches. The broadly egg-shaped, spreading petals are yellow and 4-6 mm long. The narrow, yellowish bracts arising from the base of the calyx are longer than the sepals. The achenes are hairy.

Widespread but infrequent in both dry and moist, open habitats from the valleys to above timberline at 2895 m (9,500 ft) on St. Joseph's Peak in the Bitterroot Mountains. Circumboreal, south in w. North America to CA and NM.

Shrubby cinquefoil is a common ornamental with many named horticultural forms.

Group II. This group has tall, perennial species found mostly in mesic grasslands, meadows and irrigated pastures in the valley and montane zones.

2. Potentilla gracilis Dougl.

Soft Cinquefoil

This herbaceous plant has several stout, erect stems, 30-80 cm (12-32 in) tall, from a vertical rootcrown. The basal leaves have long petioles and blades, palmately divided into 5-9 toothed or lobed, oblong leaflets. The few stem leaves are smaller with shorter petioles, and the herbage is nearly glabrous to densely hairy. Usually numerous flowers are borne in an open, leafy-bracted, often flat-topped inflorescence. The calyx is cup-shaped with lobes 4-10 mm long. The yellow petals are longer than the sepals.

This highly variable species has four intergradient varieties in our area. Var. elmeri (Rydb.) Jeps. has deeply lobed leaflets that are densely silky-hairy beneath and grayish-hairy above. It is the most common variety in the meadows along our rivers. Var. pulcherrima (Lehm.) Fern. has leaf blades with mostly 7 coarsely toothed leaflets that are grayish-hairy beneath. It has been collected once near Hamilton. Var. permollis (Rydb.) Hitchc. has mostly 5 coarsely toothed to shallowly lobed leaflets and hoary, spreading-hairy herbage. There is a single collection from the northern Bitterroot Valley. Var. flabelliformis (Lehm.) Nutt. has deeply lobed leaflets that are densely white-hairy beneath but nearly glabrous above. It is known from a single location along the West Fork of the Bitterroot River. AK to Baja Cal., east to Sask., NE, and NM.

3. Potentilla arguta Pursh

Tall Cinquefoil

A coarse herb with erect stems, 30-90 cm (1-3 ft) tall, that are glandular-hairy and often somewhat reddish. The mostly basal leaves have long petioles and blades, 10-30 cm (4-12 in) long, pinnately divided into 5-9 coarsely toothed, oval leaflets that become smaller toward the base. Stem leaves are smaller with few leaflets. Herbage is glandular and brownish-hairy. The narrow inflorescence is flat-topped with the flowers clustered near the top of the stems. The broadly lance-shaped sepals are 6-8 mm long, slightly shorter than the light yellow to nearly white petals.

Tall cinquefoil is locally common in moist meadows south of Lolo and in the Rattlesnake Creek drainage. AK to Que., south to OR, NM, OK, and NJ.

Group III. This group contains annual or biennial plants of mesic habitats, such as stream banks or disturbed soils in the valley and montane zone.

4. Potentilla norvegica L.

Norway Cinquefoil

Norway cinquefoil is an annual or biennial with 1-several erect stems, 15-60 cm (6-24 in) tall, that may have a reddish tinge and are simple or branched at the base. The leaves have 3, coarsely toothed, elliptical leaflets 2-8 cm (1-3 in) long. The herbage is spreading- to appressed-hairy. Numerous flowers are borne in a leafy, branched inflorescence. The erect sepals are about twice as long as the narrow, yellow petals.

Common in disturbed habitats such as gardens, pastures, and roadsides. Circumboreal and common in much of North America but perhaps introduced in our area.

5. Potentilla biennis Greene

Biennial Cinquefoil

This plant is a biennial or sometimes an annual with mostly solitary, erect stems, 20-50 cm (8-20 in) tall, that are glandular-hairy and often reddish. Stem leaves have 3 coarsely toothed, elliptical



q. *Petrophytum caespitosum* r. *Physocarpus malvaceus* s. *Potentilla fruticosa* t. *P. gracilis* u. *P. arguta*
v. *Potentilla norvegica* w. *P. biennis*

leaflets, 2-4 cm (ca. 1 in) long. Flowers are borne in a leafy, open, branched inflorescence. The shallowly cup-shaped calyx has erect lobes longer than the yellow petals.

Biennial cinquefoil is infrequent in moist, disturbed soil along rivers and occasionally in gardens. B.C. to Baja Cal., east to Sask., SD, CO, and AZ.

6. Potentilla rivalis Nutt.

Brook Cinquefoil

Brook cinquefoil is an annual or biennial with solitary, usually branched stems, 15-60 cm (6-24 in) tall, and hairy but non-glandular herbage. Stem leaves have 3-5 bluntly toothed, broadly lance-shaped leaflets 1-4 cm long. Numerous flowers are borne in leafy, branched inflorescences. The hairy, cup-shaped calyx has lobes that are twice as long as the yellow petals.

Uncommon in moist soil along streams, ditches, ponds, and lakes. B.C. to n. Mex., east to Sask., MO and NM.

Group IV. These perennial species occur in dry, open habitats, often in overgrazed grasslands, of the valleys and foothills.

7. Potentilla recta L.

Sulphur Cinquefoil, Erect Cinquefoil

Sulphur cinquefoil has 1-several erect, leafy stems, 20-70 cm (8-28 in) tall, that are branched above, hairy, and sometimes glandular. The leaves have long petioles with long, spreading hairs and blades palmately divided into 5-7 deeply toothed and prominently veined, narrowly lance-shaped leaflets 3-8 cm (1-3 in) long. Flowers are borne in leafy-bracted, flat-topped inflorescences. The cup-shaped calyx has strongly veined lobes shorter than the light yellow petals.

This introduced weed is becoming very common in dry, disturbed grasslands in the valleys and foothills. Native of Eurasia and well established in e. North America and parts of the Pacific Northwest.

The plant resembles the native P. gracilis and may occur in the same habitats but can usually be distinguished by the long, spreading, bristly hairs of the stem and petioles.

8. Potentilla pensylvanica L.

Prairie Cinquefoil

A perennial with a brown, scaly rootcrown and usually several stems, 15-30 cm (6-12 in) tall, that are erect or curved at the base. The leaves are pinnately divided into 5-9 finely and deeply lobed leaflets that are 1-3 cm long, grayish green above, and white-hairy to green and nearly glabrous below. Flowers are borne in a branched, congested, nearly flat-topped inflorescence. Sepals and calyx bracts are about as long as the yellow petals.

Prairie cinquefoil occurs in dry grasslands in the foothills of the Sapphire Range near Missoula and east of Victor where it is found with a number of Great Plains species. AK to Greenl., south to B.C., NV, NM, KS, and NH.

9. Potentilla argentea L.

Silvery Cinquefoil

Silvery cinquefoil has a woody rootcrown with several gray- to white-hairy stems, up to 30 cm (12 in) tall, that are erect or curved at the base. Leaves are palmately divided into 5 lance-shaped leaflets that are deeply lobed with inrolled margins and densely white-hairy undersides. Small flowers are borne in leafy, branched, open inflorescences. The cup-shaped calyx is 4-6 mm wide, and the yellow petals are as long as the sepals.

An introduced species it, is uncommon in dry, disturbed soil near Ross' Hole, east of Sula Peak, east of Gibbon's Pass Road in the southern part of our area, and along Fred Burr Creek Trail, west of Corvallis. Native of Europe and established in much of s. Can. and the U.S.

10. Potentilla hippiana Lehm.

Woolly Cinquefoil

Perennial plant with a stout branching rootcrown and stems, 10-50 cm (4-20 in) tall, that are branched above. The leaves are pinnately divided into mostly 7-13 lance-shaped to wedge-shaped leaflets, coarsely toothed with a covering of grayish hairs on both surfaces. Few to several flowers are borne in an open, branched, leafy-bracted inflorescence. The yellow petals are 5-7 mm long, longer than the lobes of the saucer-shaped calyx.

Woolly cinquefoil is known only from stony, sedimentary-derived soil on Maclay Mtn. south of Lolo. Alta. and Sask., south to AZ, NM, and NE.

Group V. Both of these perennial species occur in moist or wet habitats and spread by rhizomes or runners.

11. Potentilla palustris (L.) Scop.

Marsh Cinquefoil

This species has reddish stems up to 1 m (3 ft) long that are erect or prostrate and floating or rooting at the nodes. The leaves are pinnately divided into 5-7 oblong, toothed leaflets, mostly 3-6 cm (1-2 in) long, that are light green above and paler with a thin waxy coating below. Several dull purplish or brownish red flowers are borne in an open, often 1-sided inflorescence. The bowl-shaped calyx with



x. *Potentilla rivalis* y. *P. recta* z. *P. pensylvanica* a. *P. argentea* b. *P. hippiana*

slender, pointed lobes is about 11 mm long at flowering but swells to 20 mm at maturity. Petals are smaller than the sepals, and the stamens and styles are reddish.

In our area marsh cinquefoil usually occurs with Sphagnum moss in boggy habitats such as Mary's Frog Pond west of Lolo and Lost Trail Pass Bog. Circumboreal, south in North America to CA, WY, and IA.

The purplish flowers distinguish this from all other members of the genus.

12. Potentilla anserina L.

Silverweed

This low-growing species has a sturdy rootcrown and spreading, prostrate stems, up to 80 cm (32 in), that root at the nodes. Leaves, 8-15 cm (3-6 in) long, are pinnately divided into 7-25 coarsely toothed, lance-shaped leaflets that are usually green above and silvery white beneath. Tufts of leaves and naked, unbranched flower stems develop at these nodes. The solitary flowers have a silky, white calyx and bright yellow petals about as long as the sepals.

Silverweed is locally common in moist to wet, fine-textured soil and has been collected at the base of the Sapphire Range south of Missoula. Circumboreal and throughout most of North America.

Group VI. These perennials occur in various habitats in the montane zone to above timberline.

13. Potentilla diversifolia Lehm.

Varileaf Cinquefoil

Varileaf cinquefoil is 10-30 cm (4-12 in) tall with a stout, usually branched rootcrown. The mostly basal leaves have long petioles and spade-shaped blades palmately to pinnately divided into 5-7 lance-shaped leaflets, 1-3 cm long, that are hairy to nearly glabrous and deeply lobed or coarsely toothed above the middle. Few to several flowers are borne in an open, branched inflorescence. The saucer-shaped calyx, up to 15 mm wide, has lobes that are shorter than the yellow petals.

Var. diversifolia has leaves with mostly 5 leaflets, coarsely toothed above the middle and entire toward the base. This is our most common cinquefoil in the mountains, from lower canyons to just above timberline. The leaves of var. peridissecta (Rydb.) Hitchc. often have 7 deeply lobed leaflets. This variety is known only from near or above timberline in the southern Bitterroot Mountains. AK to CA, east to Sask. and NM.

These varieties intergrade, resulting in much variation in the structure and hairiness of the leaves.

14. Potentilla glandulosa Lindl.

Sticky Cinquefoil

This cinquefoil has stout, scaly rootstocks, very glandular-hairy foliage, and often reddish stems, 10-40 cm (4-16 in) tall, that are unbranched below the inflorescence. The mostly basal leaves are pinnately divided into 5-9 (mostly 7), egg-shaped, coarsely toothed leaflets. There are 2-3 less-divided leaves at the base of the branched, leafy-bracted, open inflorescence. The creamy white to light yellow petals are longer than the sepals.

Var. pseudorupestris (Rydb.) Breit. is 10-25 cm (4-10 in) tall with whitish flowers. It is common in dry habitats, such as rock outcrops and talus slopes from the foothills to timberline. Var. intermedia (Rydb.) Hitchc. is 20-40 cm tall with lemon- to buttercup-yellow flowers. It occurs in sandy or gravelly to deep soils, often in partial shade, from the canyons up to the lower subalpine zone of the Bitterroot Mountains. B.C. to Baja Cal., east to Alta., CO, and AZ.

15. Potentilla flabellifolia Hook.

Fanleaf Cinquefoil

Fanleaf cinquefoil has slender stems, 10-30 cm (4-12 in) tall, from a branching rootcrown. The mostly basal leaves have long petioles and blades that are divided into 3 deeply toothed, fan-shaped to egg-shaped leaflets 1-3 cm long. The 1-2 stem leaves are smaller and nearly sessile. The leafy-bracted inflorescence has only a few flowers. The saucer-shaped calyx is about 15 mm wide, and the heart-shaped petals are bright yellow and up to 10 mm long.

Common in permanently moist or wet meadows in the subalpine and timberline zones of the Bitterroot Mountains. B.C. to CA, east to Alta., MT and ID.

16. Potentilla concinna Richards

Early Cinquefoil

In our area, this species is less than 10 cm (4 in) tall with prostrate or ascending stems from a taproot and branched rootcrown. The petiolate leaves are palmately divided into 5-9 lobed, narrowly elliptical leaflets that are densely grayish- to white-hairy on both surfaces. The long-hairy sepals, 3-6 mm long, are surpassed by the yellow petals.

Var. divisa Rydb., with 5 white-hairy leaflets, has been found on rock outcrops or scree above timberline on Ward Mountain and West Boulder Peak in the southern Bitterroot Mountains. Var. macounii (Rydb.) Hitchc., with mostly 7-9 grayish-hairy leaflets, was collected in a fellfield at 2745 m (9,000 ft) on St. Joseph's Peak west of Florence. Alta. and Sask., south to NV, NM, and SD.

Prunus L. Cherry, Plum

Members of this genus are deciduous shrubs or trees that often spread by sending up shoots from shallow roots. The alternate leaves are simple with finely toothed margins. The flowers have a 5-lobed,



c. *Potentilla palustris* d. *P. anserina* e. *P. diversifolia* f. *P. glandulosa* g. *P. flabellifolia*

hemispheric calyx attached to the ovary near the base. The spreading petals are white to greenish or yellowish and larger than the sepals. Each flower has numerous stamens, 1 style, and a 1-celled ovary. The fleshy fruit contains a single hard seed.

1. Flowers numerous, in unbranched, long, narrow inflorescences.....2
1. Flowers in a hemispheric or flat-topped inflorescences.....3
2. Inflorescences with >15 flowers.....(1) P. virginiana
2. Inflorescences with <12 flowers.....(4) P. mahaleb
3. Flower clusters with a green, leaflike bract at the base; introduced.....4
3. Inflorescences not subtended by a leaflike bract; native species.....6
4. Flower and fruit stalks joined to a central axis of the inflorescence.....(4) P. mahaleb
4. Flower and fruit stalks joined together at a single point on the stem rather than an inflorescence axis.....5
5. Leaves hairy beneath at flowering.....(6) P. avium
5. Leaves glabrous beneath at flowering.....(5) P. cerasus
6. Branches often spine-tipped; leaves pointed at the tip; fruit >17 mm long.....(3) P. americana
6. Branches not spine-tipped; leaves rounded at the tip; fruit <13 mm long.....(2) P. emarginata

Group I. These are native species.

1. Prunus virginiana L.

Chokecherry

A erect shrub or sometimes a small tree up to 6 m (20 ft) tall. The elliptical to egg-shaped leaves are 4-9 cm (1-4 in) long and glabrous to slightly hairy beneath. The small, stalked, white to yellowish flowers are borne in a narrow, congested inflorescence. The nearly round petals are 4-5 mm long. The fruit is 8-11 mm long and deep reddish-purple to black at maturity.

Our plants are var. melanocarpa (Nels.) Sarg. Chokecherry is common along streams in open woodlands and on slopes as high up as ponderosa pine throughout our area. B.C. to Newf., south to CA, NM, SD, MO, and NC.

The sweet but very astringent berries are consumed by birds, bears, and humans, in that order.

2. Prunus emarginata (Dougl.) Walp.

Bitter Cherry

Bitter cherry is a shrub or small, spreading tree, up to 5 m (16 ft) tall, with twigs that are deep reddish purple. The leaves, 3-8 cm (1-3 in) long, are narrowly elliptical to lance-shaped and rounded at the tip. The 5-8 stalked, strongly scented flowers are borne in a short, pyramidal inflorescence. The greenish-white petals are 5-7 mm long. The nearly round to egg-shaped fruit, 6-12 mm long, is blackish and very bitter.

This species is locally common in the foothills and occasionally upward in the montane zone in the Bitterroot Mountains. B.C. to CA, east to MT, WY, UT, and AZ.

3. Prunus americana Marsh.

Wild Plum

Wild plum is a shrub or small tree, 1-8 m (3-26 ft) tall, that often spreads by sprouting from shallow roots. Twigs are glabrous to hairy and often harden to a spine-tip. The elliptical or egg-shaped leaves, 4-10 cm (1-4 in) long, are pointed at the tip and rounded or wedge-shaped at the base. The 1-4 stalked flowers arise from a single node to form a small, flat-topped inflorescence. Flowers appear before the leaves and have white petals 7-9 mm long. The palatable egg-shaped fruit, 18-25 mm long, has yellow flesh and skin that is yellow to red or purplish with a whitish, waxy bloom.

A few uncultivated trees occur near Hamilton. Much of e. U.S. and Can., west to MT, UT, and AZ.

The sporadic occurrences of this Great Plains species west of the Continental Divide may be the result of introductions by Native Americans.

Group II. These are 3 introduced, cultivated species that occasionally escape and persist on roadsides, near towns, and on abandoned farms. Birds, raccoons, and rodents gather the fruit and subsequently spread the seeds. They are native to Eurasia and occur sporadically wherever fruit is grown.

4. Prunus mahaleb L.

Mahaleb Cherry

This is a small, spreading tree, up to 8 m (26 ft) tall, with hairy twigs and gray to reddish bark. The leaves have slender, hairy petioles and oval to elliptical blades, 2-5 cm (1-2 in) long, that are pale green on both surfaces and have pointed tips and small gland-tipped teeth on the margins. Flowers are borne in a leafy-bracted, open inflorescence. The greenish-white petals are elliptical to broadly lance-shaped, and the black, egg-shaped fruit is unpalatable.

ROSACEAE

The plant is used by nurserymen as rootstock for cherries. It has been found near Hamilton and in the upper Rattlesnake Valley.

5. Prunus cerasus L.

Sour Cherry

Sour cherry is a small tree up to 6 m (20 ft) tall with gray bark and spreading branches that become pendulous with age. The leaves are glabrous. The showy, round petals are white to slightly pinkish. Clusters of flowers appear before the leaves and develop into red, sour cherries.

Sour cherry trees persist unattended near Lake Como and in the upper Rattlesnake Valley. (Not illustrated).

6. Prunus avium L.

Sweet Cherry

An erect tree up to 15 m (50 ft) tall with smooth, gray bark and ascending or spreading branches. The oblong to lance-shaped leaves are 8-15 cm (3-6 in) long and hairy on the lower surface. Flowers borne in clusters have white, egg-shaped petals. The fruit is a dark red to blackish, sweet cherry.

A mature unattended tree was found near Missoula. (Not illustrated).

Purshia DC. Bitterbrush

Purshia tridentata (Pursh) DC.

Bitterbrush

Bitterbrush has rigid branches and stems seldom greater than 2 m (6 ft) tall. The narrowly fan-shaped leaves, 10-25 mm long, have 3-lobed tips and are densely hairy with a white underside and a green upper surface that is rolled under along the margins. Stalked flowers are solitary in the axils of the leaves. The glandular-hairy, funnel-shaped calyx tube, 6-8 mm long, encloses the lower part of the ovary, and the 5 yellow petals are 6-9 mm long. The fruit is a black, pear-shaped achene, 6-8 mm long.

Bitterbrush is scattered in sandy soil of the open foothills of the Sapphire Range, becoming common south of Hamilton. On the west side of the Bitterroot Valley, it occurs south of Victor, often in open ponderosa pine forests such as those near Lake Como where it occurs with Ribes cereum and Potentilla fruticosa. It does not occur above 1525 (5,000 ft.). B.C. to CA, east to MT, CO, and NM.

This plant is usually cropped by deer, particularly mule deer. The seeds are taken by chipmunks, ground squirrels, and deer mice, and clusters of seedlings can often be seen sprouting from old caches.

Pyrus L. Pear, Apple

Pyrus malus L.

Apple

Wild apple is a tree or tall shrub up to 10 m (32 ft) tall. The alternate leaves are broadly lance-shaped to egg-shaped with a pointed tip and finely toothed margins. Showy, stalked flowers arise in clusters from short side branches. The nearly round calyx tube surrounds the ovary, and the sepals are long and pointed. Petals are white to pink and longer than the sepals. The fruit (an apple) has green to red skin, white flesh and usually 5 chambers in the center, each with 1-2 seeds.

Ruderal seedlings often occur along roads or on abandoned farms. The fruits attract deer and bears who damage the trees, leaving them with a rugged appearance. Wild apple trees are also a host to numerous insects and fungi that begin killing the trees as soon as they reach maturity. (Not illustrated).

Rosa L. Wild Rose

Our roses are shrubs with thorny or bristly stems and branches. The alternate leaves are pinnately divided into 3-11 toothed leaflets with prominent leafy appendages (stipules) at the base of the petioles. The large flowers are borne singly or few together at the ends of stems and side branches. The 5 pink to red petals, 5 sepals, and numerous stamens and styles are borne on top of the ovary which develops into a globose to urn-shaped, orange, red, or purplish fruit (hip). Each hip contains several light-colored, long-hairy achenes.

This is a taxonomically difficult genus with many variable species that tend to hybridize. Research on the roses in our area is needed to produce a satisfactory systematic treatment.

1. Sepals <12 mm long, falling from the fruit as it matures.....(2) R. gymnocarpa
1. Sepals usually >12 mm long, persistent on the hips.....2
2. Stems bristly, prickles at the nodes not noticeably larger than the others.....(4) R. acicularis
2. Stems often not densely prickly, prickles at the nodes stouter than the others.....3
3. Petals 25-40 mm long; sepals 15-40 mm long; flowers often solitary.....(3) R. nutkana
3. Petals 10-25 mm long; sepals mostly 10-20 mm long; flowers usually clustered.....(1) R. woodsii

1. Rosa woodsii Lindl.

Wood's Rose

Wood's rose has stems, 0.5-2 m (20-80 in) tall, with or sometimes without straight or slightly curved prickles at the nodes and scattered prickles between the nodes. The 5-9 elliptical to egg-shaped leaflets are 1-5 cm long and distinctly toothed. Flowers are clustered at the ends of the current season's growth. The glabrous sepals become spreading to erect in fruit, and the deep red to light pink petals are 10-25 mm long. Hips vary from globose to elliptical or pear-shaped.

This is the most common rose in our area, occurring as scattered individuals or thickets on open hillsides, along roads, and in river bottoms. It may occasionally reach an elevation of 1830 m (6,000 ft) in the mountains. Northwest Can. to CA, east to MN, MO, and TX.

2. Rosa gymnocarpa Nutt.

Baldhip Rose

This shrub has slender, lax stems, rarely up to 1 m (3 ft) tall, with few to numerous prickles. The teeth of the elliptical leaflets are usually gland-tipped, and the petioles and leaf axes are glandular-hairy. Flowers are solitary at the ends of branches on densely glandular-hairy stalks. The short sepals with slender tips fall off as the fruit matures. The pink to red petals are 10-15 mm long. The scarlet hips are globose to narrowly elliptical and about 1 cm long.

Baldhip rose is common and widespread in forests from the valleys to the lower subalpine zone. B.C. to CA, east to w. MT and ID.

3. Rosa nutkana Presl.

Notka Rose

Our tallest rose, this species is 1-2 m (3-6 ft) tall with stems and branches that are very prickly to nearly unarmed. The prickles at the nodes are larger with a broader base than the others. The mostly 5-7 leaflets are elliptical to egg-shaped and 1-7 cm long. The large and beautiful flowers are mostly solitary at the ends of the current season's growth. The persistent sepals, 15-40 mm long, are glabrous to glandular-hairy and narrower in the middle than at the tip. The light pink to red petals are 25-40 mm long and overlap each other. The purplish, round to pear-shaped hips are 12-20 mm long.

Our plants are var. hispida Fern. Nutka rose is infrequent along streams in the montane zone of the northern Bitterroot Mountains. AK to CA, east to w. MT and CO.

4. Rosa acicularis Lindl.

Prickly Rose

Prickly rose has weak, slender stems, 20-110 cm (8-44 in) tall, that are densely covered with straight bristles no smaller than those at the nodes. The mostly 5-7 leaflets are 1-5 cm long, often with gland-tipped teeth. Flowers with glabrous stalks are borne singly at the ends of side branches. The persistent sepals, 15-30 mm long, are slightly expanded at the tip. The pink to light red petals are 20-30 mm long, and the purplish-blue hips are 1-2 cm long.

Rare in forests of the montane zone in the northern part of our area. Circumboreal, south to ID, NM, and CO.

Rubus L. Raspberry, Blackberry

Our members of this genus are shrubs with often biennial stems that are mostly arching or trailing and frequently covered with bristles or prickles. Our species have deciduous leaves that are alternate and simple or divided into leaflets with narrow appendages (stipules) at the base of the petioles. Few to many flowers are borne in open inflorescences. The bisexual flowers have 5 white petals (ours), and the saucer-shaped calyx tube has 5 lobes and is united to the lower part of the ovary. There are many stamens and styles in each flower. The fruit is a coherent cluster of small, juicy, 1-seeded drupes.

- 1. Leaves lobed but not divided into leaflets; stems unarmed.....(2) R. parviflorus
- 1. Leaves divided into leaflets; stems with thorns or prickles.....2
- 2. Main prickles stout, flattened and recurved; fruit purple to black.....(3) R. leucodermis
- 2. Main prickles more bristly, not recurved; fruit reddish.....(1) R. idaeus

1. Rubus idaeus L.

Red Raspberry

An erect shrub with biennial stems, 70-200 cm (2-6 ft) tall, that often arch at maturity. The yellowish to cinnamon-brown bark has numerous, slender bristles and often peels away from the stems. Leaves are divided into 3-5 toothed leaflets, 4-10 cm long, that are broadly lance-shaped and rounded or wedge-shaped at the base. Few-flowered inflorescences are borne on the ends of short side branches. The broadly lance-shaped sepals, up to 8 mm long, are woolly, and longer than the petals. The sweet, red fruit is egg-shaped.

Var. gracilipes Jones has leaves that are grayish-woolly beneath and is found from the valleys to timberline. At lower elevations they often form thickets with nettles and other tall forbs in moist, humus-rich soil along creeks and rivers. In the mountains they are usually found on rock slides and boulder fields. At timberline it may occur with Ribes lacustre, both species forming low, densely prickly ecotypes. Var. peramoenus (Greene) Fern. has leaves that are green and glabrous beneath. It has been collected only once in the Bitterroot Valley. Circumboreal, south to CA, Mex., TN, and NC.



h. *Potentilla concinna* i. *Prunus virginiana* j. *P. emarginata* k. *P. americana* l. *P. mahaleb*
 m. *Purshia tridentata* n. *Rosa woodsii* o. *R. gymnocarpa*

2. Rubus parviflorus Nutt.

Thimbleberry

Thimbleberry has erect, woody stems up to 2 m (6 ft) tall that lack bristles or prickles. The brown bark often peels away from older stems. Leaves have long petioles and blades, mostly 6-15 cm (2-6 in) long, shaped like a maple leaf with 3-5 lobes. They are green and glabrous above, paler and hairy beneath with finely toothed margins. The 2-9 flowers are borne in an open, branched inflorescence at the end of the stems. Petals are 15-25 mm long. The red or orange-colored fruit is hemispheric and up to 2 cm in diameter.

Common in moist forests, especially in canyon bottoms, throughout the montane zone. AK to CA, east to Ont., SD, CO, and Mex.

The berries of this showy plant are not as tasty as other species of Rubus.

3. Rubus leucodermis Dougl.

Blackcap

This shrub has clustered, arching, biennial stems, up to 2 m (6 ft) long, that sometimes root where the tips touch the ground. The "canes" have a pale, waxy coating and are densely covered with stout thorns that are flattened at the base. Leaves have spiny petioles and blades divided into 3 (rarely 5) lance- to egg-shaped leaflets, 2-8 cm (1-3 in) long, that are green above and white-woolly beneath with toothed margins. The 2-7 flowers are clustered in the axils of the leaves. The spoon-shaped petals, up to 1 cm long, are shorter than the reflexed sepals. The hemispheric fruit is a black raspberry up to 12 mm broad.

Blackcap is known from one collection near Missoula. B.C. to CA, east to MT and UT.

Sanguisorba L. Burnet

Burnets are annual, biennial, or perennial herbs with alternate, pinnately divided leaves and divided, winglike appendages (stipules) at the base of the petioles. Small unisexual or bisexual flowers are clustered in globose to cylindrical heads at the ends of the inflorescence branches. Petals are lacking. The calyx tube is united around the ovary, and the 4 sepals are petal-like. There are 4-12 stamens and 1-2 styles. The fruit is a 1-seeded, urn-shaped achene.

1. Leaflets merely toothed; rhizomatous perennials with mostly unisexual flowers.....(2) S. minor
1. Leaflets deeply cleft into linear lobes; annual or biennial with bisexual flowers..(1) S. occidentalis

1. Sanguisorba occidentalis Nutt.

Western Burnet

A glabrous, annual or biennial herb with branching stems 20-60 cm (8-24 in) tall. The leaves, up to 8 cm (3 in) long, have up to 17 leaflets that are pinnately dissected into linear lobes. Unisexual flowers are borne in a nearly globose to cylindrical spike up to 3 cm long and 7 mm thick. The sepals, about 3 mm long, are greenish with pale margins. The urn-shaped fruits are about 3 mm long.

Western burnet is infrequent in sandy soils of open ponderosa pine forest as well as in disturbed soil of gardens and roadsides around the Missoula area. B.C. to CA, east to ID and W. MT.

2. Sanguisorba minor L.

Small Burnet

Small burnet is a rhizomatous perennial with stems up to 70 cm (28 in) tall. The lower leaves have 12-17 egg-shaped, sharply toothed leaflets, while the upper ones are greatly reduced. Mostly unisexual flowers are borne in globose to egg-shaped spikes on long stalks arising from leaf axils. Sepals are greenish to pink.

An introduced species, it is known only from a single large population along the road above McCalla Creek southwest of Stevensville. Native of Europe, common in e. U.S. and sporadic in the west.

Sibbaldia L. SibbaldiaSibbaldia procumbens L.

Creeping Sibbaldia

This is a low, mat-forming perennial with clustered, leafless stems, 5-10 cm (2-4 in) long, from creeping root crowns. The basal leaves have slender petioles, 5-10 cm long, and sparsely hairy blades divided into 3 oblong lance-shaped leaflets, 1-2 cm long, with 3-5 teeth at the tip. Few inconspicuous flowers are borne in a stalked, leafy bracted inflorescence arising from the leaf axils. The flat calyx has 5 lobes and 5 narrow bracts between them. The light yellow petals are 1-2 mm long, smaller than the sepals. There are 5 stamens and 5-15 styles. The fruit is a cluster of achenes.

Creeping sibbaldia is common near or above timberline in habitats receiving reliable, long-lasting snow cover. Circumpolar, south to CA, UT, CO, Que., and NH.

Sorbus L. Mountain Ash

These are trees or shrubs with alternate, deciduous, pinnately divided leaves. White to cream-colored, bisexual flowers are borne in congested, densely branched, flat-topped, or rounded inflorescences.



p. *Rosa nutkana* q. *R. acicularis* r. *Rubus idaeus* s. *R. parviflorus* t. *R. leucodermis*
u. *Sanguisorba occidentalis*

The urn-shaped calyx tube is united around the ovary. Flowers have 5 petals, 5 sepals, 3-5 styles and numerous stamens. The small, berrylike fruit is orange to red and contains 2-10 flattened seeds.

1. At least some leaves with >13 leaflets; trees usually found near towns.....(3) S. aucuparia
1. Shrubs with <13 leaflets; found only in the mountains.....2
2. Winter buds and young twigs reddish-hairy; fruit red with a bluish waxy coating.....(2) S. sitchensis
2. Winter buds and young twigs finely white- or grayish-hairy; fruit without a bluish waxy coating.....(1) S. scopulina

1. Sorbus scopulina Greene

Cascade Mountain Ash

This species is a shrub up to 4 m (13 ft) tall with reddish-brown branches and buds and young twigs that are finely white- or grayish-hairy. The leaves have 11-17 shiny and nearly glabrous, broadly lance-shaped leaflets with finely toothed margins. The narrow appendages at the base of the petioles fall early in the season. The white, oval petals are 5-6 mm long, and the berries are orange to red and shiny but without a waxy coating.

This is our common native mountain ash, occurring mostly at 1220-1675 m (4,000-5,500 ft), along streams and in moist meadows and forest openings. It is particularly common in the canyons of the Bitterroot Mountains such as along Lost Horse Creek and the East Fork of Lolo Creek. AK to CA, east to Alta., SD, CO, and NM.

2. Sorbus sitchensis Roemer.

Sitka Mountain Ash

Sitka mountain ash is a shrub, occasionally over 4 m (13 ft) tall, with dull reddish-purple to grayish-red bark and reddish-brown, woolly, young twigs and buds. The leaves have 7-11 narrowly egg-shaped leaflets that are green above and paler with reddish hairs along the midvein beneath. Leaflets are mostly 2-5 cm (1-2 in) long with small toothed margins and rounded or blunt tips. The narrow, brownish appendages at the base of the petioles usually have reddish hairs. The inflorescence is hemispheric rather than flat-topped. The white petals are 4-5 mm long, and the berries are red, covered with a thin bluish wax.

This species is known only from moist, deep soils along Miller and Lost Horse creeks at 1525-1675 m (5,000-5,500 ft) in the northern Bitterroot Mountains. AK to CA, east to Alta. and W. MT.

3. Sorbus aucuparia L.

Rowan Tree, European Mountain Ash

This is a tree up to 10 m (33 ft) tall with a rounded crown, gray bark and grayish-hairy buds and twigs. Leaves have 11-15 oblong leaflets, green above and paler and long-hairy beneath with toothed margins and pointed tips. The inflorescence is rounded to flat-topped. Fruits are bright red.

This European species has been planted along Missoula area streets and gardens for at least 80 years and has been introduced by birds into many surrounding areas. In moist sites, such as along Rattlesnake Creek, some have reached maturity but remain small and thin until they succumb to competition with the more vital native chokecherries, aspens and cottonwoods.

Spiraea L. Spiraea

Spiraeas are shrubs with deciduous leaves that are alternate and undivided with toothed margins. Small flowers are densely clustered in showy, highly branched, flat-topped to spikelike inflorescences. The calyx has 5 erect or reflexed lobes and is partly attached to the ovaries. There are 5 white to pink petals, usually 5 styles, and numerous stamens. Fruits are a small cluster of dry, 2- to several-seeded capsules.

1. Inflorescence flat-topped or nearly so.....2
1. Inflorescence elongated, spikelike, or pyramid-shaped.....3
2. Petals pink to red; lower surface of leaves often somewhat hairy; most common in the subalpine zone.....(2) S. densiflora
2. Petals white, sometimes with a pinkish tinge; plants glabrous or nearly so; most common in the montane zone.....(1) S. betulifolia
3. Inflorescence pyramid-shaped; petals whitish to pale pink.....(4) S. pyramidata
3. Inflorescence more narrow and spikelike; petals dark pink to reddish.....(3) S. douglasii

1. Spiraea betulifolia Pall.

White Spiraea

White spiraea has erect or spreading stems, 20-60 cm (8-24 in) tall, arising from strong rhizomes. The oblong to egg-shaped leaves, 2-7 cm (1-3 in) long, are dark green above and pale beneath. The flat-topped inflorescence bears flowers that are cream to white, sometimes with a faint pinkish tinge. The petals are about 2 mm long, and the fruits are about 3 mm high.

This species is very common on brushy or open slopes as well as forests from the foothills through the montane zone. B.C. to OR, east to Sask., SD, and WY.

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White spiraea is often abundant in our drier, lower forests, but it blooms only infrequently in these shaded habitats.

2. *Spiraea densiflora* Nutt.

Subalpine Spiraea

This species is similar to *S. betulifolia*, but the stems, arising from deep rootstocks, are more rigid and densely branched. The pink to bright rose-red flowers are borne in small, flat-topped inflorescences. The petals are 1-2 mm long, and the fruits are 2-3 mm high.

Subalpine spiraea is infrequent in cool, Bitterroot Mtn. canyons at 1220-1525 m (4,000-5,000 ft) but becomes common in the subalpine zones in permanently moist habitats such as bedrock shelves and streamside meadows. B.C. to CA, east to MT and ID.

With increasing elevation, this plant becomes smaller, but the floral display becomes more colorful and persistent.

3. *Spiraea douglasii* Hook.

Pink Spiraea

Pink spiraea is a vigorous shrub with erect, spreading stems 1-1.8 m (3-6 ft) tall. The oblong leaves, 3-10 cm (1-4 in) long, are glabrous-green above and paler and hairy beneath with finely toothed margins toward the tips. Flowers are borne in dense, narrowly elliptical clusters arranged in a slender, elongated inflorescence 10-20 cm (4-8 in) long. Muted pink to bright rose-red petals, 1-2 mm long, quickly fade to brown.

Our plants are var. *menziesii* (Hook.) Presl. This species occurs in moist to wet habitats, usually along streams, at 1280-1675 m (4,200-5,500 ft) in the Lolo Creek drainage. AK to CA, east to MT and ID.

4. *Spiraea X pyramidata* Greene

Pyramid Spiraea

This putative hybrid between *S. douglasii* and *S. betulifolia* is about 1 m (3 ft) tall with leaves similar to the former. Flowers are borne in dense nearly globose clusters arranged in a pyramid-shaped inflorescence. The petals are very light pink.

Pyramid spiraea is known from one collection near Lolo Hot Springs. B.C. to OR, east to ID and W. MT.

Waldsteinia Willd. *Waldsteinia*

Waldsteinia idahoensis Piper

Idaho Strawberry

This perennial herb has erect, leafless stems up to 20 cm (8 in) tall from strong rhizomes. The leaves have long petioles and glossy, broadly spade-shaped blades, 3-5 cm (1-2 in) wide, that are lobed into 3 broad, coarsely toothed segments. Some of the leaves persist through the winter. The 1-3 stalked flowers are borne in the open, terminal inflorescence, subtended by small bracts. The calyx tube, 2-3 mm long, has spreading lobes, and the light yellow petals are 4-5 mm long. The fruit is a cluster of 2-6 hairy achenes.

One population is known from moist, rich soil of a ponderosa pine forest above Granite Creek north of Lolo Hot Springs. West-central ID and adjacent MT.

RUBIACEAE Madder Family

Our members of this family are annual and perennial herbs with slender, often lax and mostly 4-sided, leafy stems. The simple, mostly entire leaves are opposite or whorled in clusters of 3-8. Flowers are small, white or greenish, bisexual or unisexual, and solitary or in open clusters. The calyx has small teeth or is lacking. The corolla is 3-5-lobed with the petals partially fused. Fruits are smooth to bristly-hairy capsules with 2 chambers, each bearing a single seed.

Galium L. Bedstraw

Bedstraws are annual or perennial herbs with 4-angled stems and entire, whorled leaves. The small, 4-parted flowers are white, dull yellow, or creamy-colored. The two lobes of the spiny to smooth fruits separate at maturity into 1-seeded globe-shaped nutlets.

1. Annual plants from a short, weak taproot.....2
1. Perennial plants from creeping rhizomes.....3
2. Leaves 2-4 in a whorl, lacking a abrupt, pointed tip; stems smooth; flowers solitary...(7) *G. biflorum*
2. Leaves 5-8 in a whorl, cuspidate; stems rough when stroked tip to base; 3-5 flowers on axillary peduncles.....(6) *G. aparine*
3. Fruits with hairs or bristles that are hooked at tip.....4
3. Fruits lacking hooked hairs and lacking roughened (scrabrous) surface.....5



v. *Sanguisorba minor* w. *Sibbaldia procumbens* x. *Sorbus scopulina* y. *S. sitchensis* z. *S. aucuparia*
a. *Spiraea betulifolia* b. *S. densiflora* c. *S. douglasii* d. *S. pyramidata*

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4. Bristles of fruit very short, 0.15-0.3 mm or the fruit only scabrous; flowers terminating stem and branches.....(3) G. asperrimum
4. Bristles of fruit longer, mostly 0.5-1.0 mm; flowers arranged in 3's at ends of axillary peduncles.....(4) G. triflorum
5. Flowers numerous in a terminal, compound, much branched inflorescence; stems mostly erect and smooth to hairy but not scabrous.....6
5. Flowers solitary or few in a small, rather inconspicuous inflorescence; stems weak and tending to scramble on other vegetation and scabrous on stem angles.....(5) G. trifidum
6. Leaves in whorls of 4, 3-nerved, lacking an abrupt, pointed tip.....(1) G. boreale
6. Leaves in whorls of 6-8, 1-nerved, with abrupt, sharp, rigid tips.....(2) G. verum

Group I. Included here are rather showy and definitely perennial plants with many stems emanating from rhizomes. They mostly grow erect (some branches ascending and even prostrate) and rarely scramble on other vegetation. Numerous flowers are arranged in terminal, compound, and highly branched inflorescences.

1. Galium boreale L.

Northern Bedstraw

The mostly erect to ascending, 4-angled stems of northern bedstraw are smooth and 20-60 cm (8-24 in) tall. Leaves are prominently 3-nerved and in whorls of 4. Axillary branches bear smaller, densely set, overlapping leaves. The numerous creamy-white, honey scented flowers are arranged in terminal panicles.

This circumboreal species is widespread in our area from alluvial soils of the valleys to closed, montane, Douglas-fir forests. It is more common on calcareous to neutral substrates east of the Bitterroot River. It is absent in the Bitterroot Mountains proper perhaps owing to their shallow, acid soils that develop from granitics or metamorphosed volcanics.

2. Galium verum L.

Yellow Bedstraw

Stems of this rhizomatous perennial are densely short-hairy in the terminal densely, yellow-flowered inflorescence. Leaves, up to 12 in an upward-pointing whorl, are narrowly linear with inrolled margins.

This European species has escaped from cultivation to become a weed. It is rare in our area, having been collected on Mount Sentinel and along Missoula's railroad tracks.

Group II. This assemblage includes common plants of wide distribution. All are rhizomatous perennials with branching stems and typically tend to scramble on other vegetation. The 1-nerved leaves are 4, 5, or 6 to a whorl. They are more shade tolerant and require more moisture than the species of Group I.

3. Galium asperrimum Gray [G. mexicanum H.B.K.]

Rough Bedstraw

The leaves have a sharp, short, firm point. Individual flowers are less than 3 mm wide, but the inflorescence is large. It has leaflike bracts and terminates the main and side branches. Fruits are covered with hooked bristles.

Common in our mountains from the foothills to subalpine alder thickets. East of the Cascades in WA and OR, east to w. MT, south to CA, NM, and n. Mex.

4. Galium triflorum Michx

Sweetscented or Fragrant Bedstraw

Stems tend to be more prostrate and less climbing than other species in this group, and the upper stems and leaves are nearly smooth. The narrowly elliptic, sharp-pointed, vanilla-scented leaves typically occur in whorls of 6. The inconspicuous flowers are borne in open, mostly 3-flowered inflorescences arising from the leaf axils. The fruits, 1.5-2 mm long, are mantled with short, hooked bristles.

Though sweetscented bedstraw is circumboreal and has a broad elevational range, it has relatively narrow moisture requirements, making it a useful indicator of moist forest environments wherein subalpine fir or Engelmann spruce are the climax dominants. It also occurs in wet to moist alder or willow thickets. In the southern Bitterroot Mountains it occurs as high as 2,500 m (8,200 ft). Extending south in North America to CA, Mex., and FL.

5. Galium trifidum L.

Small Bedstraw or Cleavers

Small bedstraw has slender, weak, highly branched stems, up to 60 cm (24 in) long, that are smooth to roughened. It does scramble on other vegetation to some degree. The narrowly elliptical and sessile leaves have rounded ends and are arranged mostly 4 to a whorl. The tiny flowers, mostly 2-3 together, are arranged at the ends of numerous short axillary or terminal branches. Fruits are smooth, or nearly so.

This plant, not nearly so common as G. triflorum, has been collected at lower elevations, along river, creeks, ditches, and moist meadows. This circumpolar species extends south in America to CA, n. Mex., AL, and GA.

Group III. These species, all annuals, are typified by weak taproots, minute greenish-white or white flowers and fruits with hooked bristles.

6. Galium aparine L.

Cleavers, Goose-grass

Cleavers is a vigorously growing plant with weak but not slender stems, up to 1 m (40 in) long, with small hooked hairs on the angles that enable it to scramble on other vegetation. Leaves in a whorl of mostly 6 or 8 are narrow and 1-nerved. They terminate in a sharp, abrupt, firm point. The inflorescences are small and 3-5 flowered. They are borne on axillary peduncles that bear mostly complete whorls of leaves at the summit, or the peduncles may be borne in 3's at the ends of short axillary branches.

This circumboreal species occurs over most of temperate North America and also the southern hemisphere. In our area it is known from a range of moist habitats, but not at elevations above 1,830 m (6,000 ft).

7. Galium bifolium Wats.

Thinleaf Bedstraw

With slender, erect stems only 5-20 cm (2-8 in) tall, thinleaf bedstraw is the smallest, and most distinctive species. The stems are simple to sparingly branched, and the herbage is smooth. The linear elliptical leaves are only 10-20 mm long, in whorls of 4, often with one pair larger. Leaf tips are either blunt or abruptly pointed. Flowers are solitary in the leaf axils.

Occurs on moderately dry, often vernal moist habitats, in more or less shaded places. In our area it is recorded from the valleys and lower mountains only, but has been collected in the adjacent Anaconda-Pintler Range, just below timberline. From s. B.C. and MT south to s. CA and CO.

SALICACEAE Willow Family

Plants in this family are deciduous trees and shrubs with alternate, undivided leaves that have entire or toothed margins. Small, winglike appendages (stipules) are often present at the base of the petioles. Male and female flowers are borne on separate plants and appear before or after the leaves. Flowers are subtended by small bracts (scales) and are arranged in erect or drooping, spikelike inflorescences (catkins or aments) borne near the ends of the twigs. Petals and sepals are lacking. The male flowers consist of 2-many stamens, while the female flowers have a single ovary and a style (sometimes lacking) with 2-4 stigmas at the tip. The fruit is a dry capsule containing numerous seeds, each bearing a tuft of white hairs.

Populus L. Poplar, Cottonwood, Aspen

Members of this genus are trees with sticky, resinous leaf buds, and sharp-pointed, mostly glabrous leaves with long petioles, finely toothed margins, and stipules that fall off early in the year. Older trees have gray, rough bark, while that of younger trees is often smooth and whitish. The unisexual flowers are borne in long, drooping catkins that appear before the leaves. Each flower is subtended by a small toothed or lobed scale. Male flowers have several to many stamens. Female flowers have a very short style with 2-4 stigmas. The capsules mature and begin dispersing seed before the leaves are fully developed.

1. Leaf petiole with a groove on the upper side near the blade; rare.....(3) P. acuminata
1. Petioles lacking a groove on the upper surface.....2
2. Petioles flattened laterally; blades spade-shaped, abruptly narrowed to the tip.....(1) P. tremuloides
2. Petioles nearly round in cross section; blades lance-shaped, narrowed gradually to the tip.....(2) P. trichocarpa

1. Populus tremuloides Michx.

Quaking or Trembling Aspen

Our aspens rarely exceed 15 m (50 ft) and have an open, rounded crown. The bark is greenish-white to light gray, usually with dark patches caused by injuries or cracking. The shallow, spreading roots often give rise to sprouts that may eventually become mature trees. The leaves have long slender petioles and broadly spade-shaped blades, 2-7 cm (1-3 in) long, that are light green above and paler beneath with a point at the tip. Bud scales are shiny but barely resinous. Male catkins are 2-3 cm long, while the female ones are 4-10 cm (2-4 in) long. The scales subtending the flowers are lobed with long, white hairs towards the tip. The greenish lance- to egg-shaped capsules mature in May or June.

Quaking aspen is intolerant of dense shade and occurs most often in nearly pure stands in openings of coniferous forest, rock slides or in moist areas surrounded by grasslands in the montane zone, usually below 1830 m (6,000 ft) but up to 2255 m (7,400 ft) above Chaffin Lakes in the Bitterroot Mountains. AK to Lab., south to CA, Mex., and TN.

On the north side of Lost Horse Creek at 1705 m (5,600 ft) in the Bitterroot Mountains, the aspens are tilted downhill at an angle of about 45 degrees from recurring pressure of snow and occasional avalanches.



e. *Waldsteinia idahoensis* f. *Galium boreale* g. *G. verum* h. *G. asperum* i. *G. triflorum* j. *G. trifidum*
 k. *Galium aparine* l. *G. bifolium*

2. Populus trichocarpa T. & G.
[P. balsamifera L. (in part)]

Black Cottonwood

This large tree may be up to 50 m (160 ft) tall with a trunk over 1 m (3 ft) in diameter and a rounded crown. The gray bark is deeply furrowed. The fragrant leaves have long petioles and slightly resinous, broadly lance-shaped blades, 5-15 cm (2-6 in) long, that are paler and often reddish tinged beneath with gland-tipped teeth along the margins. The long, pointed buds are very resinous. The flower scales have hairy, divided and toothed margins and fall as the catkins expand. Male catkins are 2-3 cm long, while the female ones are up to 20 cm (8 in) long. Capsules are spreading-hairy and nearly sessile.

Black cottonwood is common along all of our rivers and lower creeks up to 1525 m (5,000 ft). AK to Baja Ca., east to Alta., WY, and UT.

Cottonwood seeds are easily dispersed but require disturbance, such as scouring by flooding streams, to germinate. Seedlings and saplings can sometimes be found on open slopes or along roads where surface moisture and scarification has been sufficient to cause germination, but these plants rarely reach maturity.

3. Populus acuminata Rydb.

Smooth-barked, Lanceleaf or Rydberg's Cottonwood

This species is rarely greater than 20 m (65 ft) tall. The leaves have petioles that are narrowly channeled above and lance-shaped blades that are broadest near the middle. Male plants have never been collected.

This species is believed to be a hybrid between P. deltoides and P. angustifolia, neither of which is found in our area. It has been reported from the northwest end of the Bitterroot Valley. Alta. and SD, south to MT, AZ, and NM.

Salix L. Willow

Willows are trees or, more often, shrubs with numerous stems. The winglike appendages (stipules) at the leaf bases are usually larger on young shoots, and the buds are covered by a single, non-resinous scale. The erect or spreading catkins are borne on young twigs or leafy side-branches. The male flowers have 1-5 (usually 2) stamens. The often stalked, lance-shaped ovary has a single style and 2 stigmas.

Key for use on plants with female catkins

1. Plants dwarfed and prostrate, rarely over 6 cm (2 in) high; alpine.....2
1. Plants with erect stems usually at least 30 cm (12 in) tall; valleys to timberline.....3
2. Flower scales yellow to green, glabrous on the outer surface.....(17) S. nivalis
2. Flower scales blackish, hairy on both surfaces.....(18) S. arctica
3. Ovaries and capsules hairy.....4
3. Ovaries and capsules glabrous.....15
4. Catkins sessile or borne on stalks <10 mm long lacking conspicuous, leafy bracts.....5
4. Catkins borne on leafy side branches 5 mm-20 cm long.....9
5. Twigs formed the previous year with a thin, whitish, waxy coating (easily rubbed off), at least in some places, such as behind the buds.....6
5. Twigs of the previous year without waxy coating.....7
6. Mature capsules 3-4 mm long.....(8) S. drummondiana
6. Mature capsules >4 mm long.....(13) S. phylicifolia
7. Leaves densely silvery hairy beneath.....(15) S. sitchensis
7. Leaves glabrous to moderately hairy beneath when young.....8
8. Plants mostly low to medium shrubs usually in wet meadows; twigs formed the previous year glabrous; styles usually ca. 1 mm long.....(13) S. phylicifolia
8. Plants usually tall shrubs of more upland habitats; previous year's twigs often hairy, at least behind the buds; styles usually ca. 0.5 mm long.....(4) S. scouleriana
9. Leaves with an evident, thin, whitish, waxy coating (easily rubbed off) beneath, sometimes hairy as well.....10
9. Leaves without waxy coating beneath.....13
10. Twigs formed the previous year with a thin, whitish waxy coating, at least behind the buds.....(9) S. geyeriana
10. Twigs without waxy coating.....11
11. Leaves narrow, >4 times as long as broad.....(3) S. exigua
11. Leaves not distinctly narrow, <4 times as long as broad.....12

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12. Shrubs <1.5 m (5 ft) tall; styles 0.5-1 mm long.....(16) S. brachycarpa
12. Shrubs or small trees usually >2 m (6 ft) tall; styles > 1 mm long.....(5) S. bebbiana
13. Leaves narrow, <1 cm wide.....(3) S. exigua
13. Leaves wider.....14
14. Leaves ca. equally green on both surfaces.....(10) S. commutata
14. Leaves densely white-hairy beneath, green and sparsely hairy above.....(15) S. sitchensis
15. Flower scales yellow or greenish, not persistent; trees or shrubs.....16
15. Flower scales brown or black, persistent; shrubs.....18
16. Leaf blades linear; plants colonial with stems arising singly or in small groups.....(3) S. exigua
16. Leaf blades narrowly lance-shaped; plants not colonial, trees or clumped shrubs.....17
17. Leaves without waxy coating beneath; native shrubs or small trees.....(7) S. lasiandra
17. Leaves with a thin, whitish, waxy coating beneath.....18
18. Stalks of capsules >1 mm long.....(2) S. amagdyloides
18. Stalks of capsules <1 mm long.....(1) S. alba
19. Catkins nearly sessile without conspicuous, leafy bracts at the base.....(11) S. monticola
19. Catkins borne on short, leafy side branches.....20
20. Leaves with a thin, whitish, waxy coating beneath.....21
20. Leaves without waxy coating beneath.....22
21. Leaves of older branches with entire margins; plants mostly <1.5 m (5 ft) tall.....(12) S. farriar
21. Leaves mostly with toothed margins; plants usually >1.5 m tall.....(6) S. rigida
22. Leaves glabrous or nearly so at maturity.....(14) S. myrtilifolia
22. Leaves evidently hairy.....(10) S. commutata

Key for use on plants without female catkins

1. Plants dwarfed and prostrate, rarely over 6 cm (2 in) high; alpine.....2
1. Plants with erect stems usually at least 30 cm (12 in) tall; valleys to timberline.....3
2. Leaf blades gradually tapered to the petiole.....(18) S. arctica
2. Leaf blades abruptly contracted to the petiole.....(17) S. nivalis
3. Leaves with a thin, whitish, waxy coating beneath (easily rubbed off) and not hidden by dense covering of hairs.....4
3. Leaves without a waxy coating beneath or waxy coating completely obscured by dense covering of hairs.....18
4. Leaves from all but current year's growth with toothed margins.....5
4. Leaves from all but current year's growth without toothed margins.....10
5. Trees, not spreading extensively from the roots and mostly not with clumped stems at the base.....6
5. Mid-size to tall shrubs with stems clustered at the base or spreading extensively from the roots.....7
6. Leaf margins usually with some of the teeth gland-tipped.....(1) S. alba
6. Leaf margins without gland-tipped teeth.....(2) S. amygdaloides
7. Leaf blades usually <15 mm wide, tapered gradually to the petiole.....8
7. Leaf blades often >15 mm wide, abruptly contracted to the petiole.....9
8. Petioles <5 mm long.....(3) S. exigua
8. Petioles >5 mm long.....(13) S. phylicifolia
9. Older twigs (3rd and 4th year) pale, grayish.....(6) S. rigida
9. Older twigs darker, reddish or brownish.....(11) S. monticola
10. Twigs of the current year at least partly covered with hair.....11
10. Twigs of the current year glabrous or very sparsely hairy.....16
11. Second year and older parts of current year's twigs covered, at least behind the buds, with a thin, whitish, waxy coating.....(9) S. geyeriana
11. Twigs without waxy coating.....12

12. Leaves narrow >4 times as long as wide.....(3) *S. exigua*
 12. Leaves <4 times as long as wide.....13
13. Plants usually <1.5 m (5 ft) tall.....14
 13. Plants mostly >1.5 m tall.....15
14. Mature leaves moderately to densely hairy.....(16) *S. brachycarpa*
 14. Mature leaves glabrous or sparsely hairy.....(12) *S. farriar*
15. Leaves broadest above the middle; plants often from upland sites.....(4) *S. scouleriana*
 15. Leaves broadest at or below the middle; long streams and in wet meadows.....(5) *S. bebbiana*
16. Older (3rd and 4th year) twigs pale, grayish.....(6) *S. rigida*
 16. Older twigs darker, reddish or brownish.....17
17. Twigs and upper leaf surfaces shiny.....(13) *S. phylicifolia*
 17. Twigs and upper leaf surfaces dull.....(12) *S. farriar*
18. Mature leaves glabrous or nearly so.....19
 18. Mature leaves noticeably hairy on at least one surface.....21
19. Upper portion of petiole with glands (small bulge); tree or tall shrub.....(7) *S. lasiandra*
 19. Petiole without glands; shrubs.....20
20. Leaf blades mostly <5 mm wide; stems arising singly or in small clumps; valleys.....(3) *S. exigua*
 20. Leaf blades >5 mm wide; stems clumped at the base; subalpine or higher.....(14) *S. myrtillifolia*
21. Hair of leaves dense below, much less so above.....22
 21. Hair of leaves equally dense on both surfaces or denser above than below.....23
22. Second year twigs and older current year's twigs with thin, whitish, waxy coating at least behind the buds.....(8) *S. drummondiana*
 22. New twigs covered with velvety hair, without waxy coating.....(15) *S. sitchensis*
23. Leaves usually <1 cm wide.....(3) *S. exigua*
 23. Leaves mostly >1 cm wide.....(10) *S. commutata*

Group I. Both are trees or tall shrubs found in the floodplains of our rivers.

1. *Salix alba* L.

Yellow-twigged Willow

This is a tree up to 25 m (80 ft) tall with yellow twigs and young branches. The lance-shaped leaves, 10-15 cm (4-6 in) long, are glossy green above and lighter beneath with toothed margins. Male catkins are 3-5 cm (1-2 in) long, and the females are stalked and 5-7 cm (2-3 in) long. Both appear at the same time as the leaves. Capsules are glabrous.

This Eurasian introduction is infrequent along the Bitterroot River. Our plants are var. *vitellina* (L.) Stokes. Scattered throughout much of the U.S. (Not illustrated).

2. *Salix amygdaloides* Anderss.

Peachleaf Willow

Peachleaf willow is a tall shrub or small tree with 1-several stems up to 12 m (40 ft) tall and glabrous or slightly hairy foliage. The often drooping twigs are yellowish or reddish brown. The lance-shaped leaves, 5-10 cm (2-4 in) long, have finely toothed margins and are tapered to the long, pointed tip. They are green above, and pale with a thin, waxy coating below. The catkins appear with the leaves and are borne on short side branches with blunt-tipped, entire-margined leaves. The yellowish flower scales are long-hairy and fall soon after blooming begins. Slender male catkins are 4-7 cm (2-3 in) long with usually 5 stamens per flower. The anther stalks are hairy at the base. Female catkins, 5-7 cm (2-3 in) long, have glabrous capsules with a stalk, 1-2 mm long, and a broad, shallowly lobed stigma.

This species is infrequent along major rivers in our area. B.C. to AZ, east to much of the U.S.

Group II. This willow is usually a shrub, common in river bottoms and scattered along lower reaches of many creeks.

3. *Salix exigua* Nutt.

Sandbar Willow

[*S. melanopsis* Nutt., *S. fluviatilis* var *exigua* Sarg.]

Sandbar willow has slender, erect, light gray stems up to 5 m (16 ft) tall that arise singly or a few together and form large colonies from spreading roots. Branches are mostly reddish with green and short-hairy young twigs. Leaves have short petioles and linear to narrowly lance-shaped blades up to 15 cm (6 in) long and 4-20 mm wide with entire or weakly toothed margins. The small stipules fall early. Catkins



m. *Populus tremuloides* n. *P. trichocarpa* o. *P. acuminata* p. *Salix amygdaloides* q. *S. exigua*

are borne on leafy side branches at the same time or just after the leaves. The yellow flower scales are long-hairy and fall soon after blooming. Male catkins have 2 stamens with yellow anthers and anther stalks that are hairy at the base. Female catkins, 3-6 cm (1-2 in) long, have flowers with glabrous or hairy capsules and 2 nearly sessile, deeply 2-lobed stigmas.

Widespread in our area. AK to CA, east to much of U.S.

The non-clumped, colonial growth form is unique among our willows.

Group III. These are common, clump-forming, shrubby willows found from the valley to montane zones and occasionally into the subalpine.

4. Salix scouleriana Barratt

Scouler's Willow, Fire Willow

A tall shrub or rarely a small tree, Scouler's willow is 1.5-10 m (4-33 ft) tall with dark reddish-brown branches and glabrous to densely hairy twigs. The leaves have petioles, 1-2 cm long, and broadly to narrowly lance-shaped blades, up to 12 cm (5 in) long, with obtuse or abruptly narrowed tips and smooth or shallowly toothed margins. They are dark green and glabrous above and veiny with a pale waxy coating and often densely hairy below. Both leaves and stipules are much larger on younger shoots. The nearly sessile catkins are produced before the leaves and often have a few small bracts at the base. Male catkins are 2-4 cm long with 2 stamens per flower, and female catkins are 2-7 cm (1-3 in) long. The narrow, densely hairy capsules are 5-8 mm long with a 1-2 mm long stalk and a style shorter than the 2-lobed stigma.

This is our common upland willow, occurring beneath forest canopies and often very common in recently burned forests and clearcuts. AK to Man., south to CA, NM and SD.

5. Salix bebbiana Sarg.

Bebb Willow

Bebb willow is a shrub or rarely a small tree up to 4 m (13 ft) tall with brownish, thinly to densely hairy, young twigs. The leaves have petioles up to 1 cm long and narrowly elliptical blades, 3-8 cm (1-3 in) long, with entire or finely toothed margins. They are green above, paler with a thin waxy coating below, and hairy to nearly glabrous at maturity. The stipules of older branches are small and quickly lost, while those of young branches are large and conspicuous. The catkins, appearing with or just before the leaves, have a short stalk with a few leaflike bracts or are nearly sessile. The persistent, narrow flower scales are yellowish to light brown and covered with long hairs. Male catkins are 10-25 mm long with 2 stamens per flower, and the females are 2-6 cm (1-2 in) long. The short-hairy capsules, 5-9 mm long, have stalks, 2-5 mm long, and short, nearly sessile, 2-lobed stigmas.

Var. perrostrata (Rydb.) Schneid. has thinly hairy lower leaf surfaces with poorly defined veins. It is common along rivers and streams in the valley and montane zones and is occasionally found on moist lower slopes. Var. bebbiana with densely hairy and veiny lower leaf surfaces is infrequent in the valleys. Across Can., south to much of the U.S.; Siberia. This species is part of a circumboreal complex including the Eurasian S. depressa L.

6. Salix rigida Muhl.

Mackenzie Willow

[S. monochroma Ball, S. lutea Nutt.]

This is a shrub, occasionally treelike, with several strong stems up to 6 m (19 ft) tall, yellowish gray bark, and glabrous, yellow young twigs. The leaves have 1 cm long petioles abruptly joined to the lance-shaped blades with finely toothed margins. They taper to a long, pointed tip and are 5-15 cm (2-6 in) long, glabrous and yellowish-green above and pale with a thin waxy coating below. Stipules are inconspicuous on older branches but are large and crescent-shaped on younger twigs. Catkins are borne on short, leafy side branches and appear with or just before the leaves. The axis of the catkins is densely white-hairy, and the flower scales are glabrous and light brown to blackish. Male catkins are 2-5 cm (1-2 in) long with 2 stamens per flower, and the female catkins are 3-8 cm (1-3 in) long. The glabrous capsules are up to 7 mm long with short styles and scarcely 2-lobed stigmas.

Our plants are var. mackenziana (Hook.) Cronq. It is common along streams and river bottoms occasionally into the subalpine zone. AK to Newf., south to CA, AZ, and VA.

7. Salix lasiandra Benth.

Whiplash Willow

Whiplash willow is a shrub or rarely a small tree up to 7 m (23 ft) tall with stems up to 30 cm (12 in) thick and smooth, gray bark that becomes dark and fissured with age. The yellow to reddish brown twigs are hairy when young, becoming glabrous with age. Leaves have petioles less than 15 mm long with 2-few glands near the base of the blade. The lance-shaped to narrowly elliptical blades, 7-15 cm (3-6 in) long, taper gradually to the base and have finely toothed margins. Leaves of young shoots are larger, and the stipules are large and leafy. Catkins appear with the leaves and are borne on short side-branches with smaller, rounded leaves. The yellowish flower scales are hairy on the inside and fall soon after opening. Male catkins are 2-6 cm (1-2 in) long with 3-5 stamens per flower, and the female catkins are 3-8 cm long. The glabrous capsules, 4-8 mm long, have short stalks and short, broad stigmas.

Var. caudata (Nutt.) Sudw., with leaves that are green on both surfaces, is common along rivers and streams in the valley and montane zones. Var. lasiandra has leaves that are paler beneath than above. It occurs infrequently near the Idaho border up to the lower subalpine zone. AK south to CA, NM, and SD.

8. Salix drummondiana Barratt

Drummond Willow

A shrub with stems up to 3 m (10 ft) tall and purplish-brown branches. The twigs are yellow and finely hairy when young but become brown and covered with a thin waxy coating that persists into the second year. The leaves have petioles, 4-9 mm long, and lance-shaped to narrowly elliptical blades, 3-8 cm (1-3 in) long, that are silvery white-hairy beneath and dark green and nearly glabrous with impressed veins above. The margins are rolled under. Stipules of older branches are small and fall quickly, while those of young shoots are larger and more persistent. The nearly sessile catkins usually appear before the leaves. The dark brown or blackish flower scales are covered with long hairs. Male catkins, up to 3 cm (1 in) long, have 2 stamens per flower. Female catkins are 3-6 cm long. The densely hairy, nearly sessile capsules, 3-6 mm long, have styles about 1 mm long and 2 stigmas that may be divided or not.

Drummond willow occurs from the upper river valleys to the subalpine zones but is common only in the Sapphire Range, where it may be the dominant willow. B.C. to CA, east across s. Can. and n. U.S.

This species tends to intergrade with S. sitchensis in our area, resulting in plants with catkins borne on short, leafy side branches.

9. Salix geyeriana Anders.

Geyer Willow

This shrub grows up to 4 m (13 ft) tall with dark gray, older branches and slender, yellowish-green to brown twigs that are covered with a thin, waxy coating. The leaves have slender petioles up to 10 mm long and lance-shaped to narrowly elliptical blades, 3-5 cm (1-2 in) long, that are nearly glabrous to long-hairy with entire margins and a thin waxy coating beneath. The small stipules fall as the leaves expand. Catkins are borne on short, leafy side branches at the same time as the leaves. The yellowish to black flower scales are hairy, often with a reddish tip. Male catkins, up to 10 mm long, have flowers with 2 stamens that are hairy at the base. Female catkins are up to 25 mm long. The short-hairy capsules, 5-7 mm long, have long stalks and short styles with 2-lobed stigmas.

Geyer willow occurs in all of our mountain ranges up to nearly 2135 m (7,000 ft) and is common in moist meadows of the Bitterroot River floodplain. B.C. to CA, east to MT and CO.

In the valleys, this species often occurs with S. exigua but can be distinguished by its clumped and branched rather than slender, erect growth form.

Group IV. These species occur almost exclusively from the montane zone up to timberline.

10. Salix commutata Bebb

Undergreen Willow

Undergreen willow has stems up to 3 m (10 ft) tall with yellow or brownish twigs that are densely covered with long hairs. The leaves have short petioles and egg-shaped to broadly lance-shaped blades, 4-7 cm (2-3 in) long and rounded at the base. They have entire margins and are densely long-hairy to nearly glabrous at maturity. The leaflike stipules, up to 1 cm long with gland-tipped teeth, fall before maturity. Catkins are borne on leafy branches and appear with the leaves. The light brown flower scales are long-hairy. Male catkins, 1-3 cm long, have 2 glabrous stamens per flower, and female catkins are up to 6 cm (2 in) long. The glabrous to sparsely hairy capsules, 3-6 mm long, are borne on short stalks and have styles longer than the 2-lobed stigmas.

This willow is common in wet meadows around lakes and around late snow banks near timberline, often with S. monticola, in the Bitterroot Mountains. It is not known from the Sapphire Range. AK to CA, east to Alta., WY, and UT.

11. Salix monticola Bebb

Mountain Willow

[S. pseudomonticola Ball, S. barclayi var. pseudomonticola Kelso]

Mountain willow is a shrub, 1-3 m (3-10 ft) tall, with yellowish to reddish branchlets that are short-hairy when young. The leaves have petioles up to 15 mm long and elliptical to broadly lance-shaped blades, 4-8 cm (2-3 in) long, that have a thin waxy coating beneath and are hairy when young but later become glabrous. They are strongly veined with toothed to entire margins. Stipules on older branches are small and quickly lost, while those of younger twigs are leaflike and up to 1 cm long. The nearly sessile catkins appear with the leaves and have long-hairy, dark brown to black flower scales. Male catkins, 2-4 cm long, have 2 glabrous anthers per flower, and the female catkins are up to 7 cm (3 in) long. The glabrous capsules, 4-7 mm long, have very short stalks and styles 1-2 cm long with short, scarcely 2-lobed stigmas.

The shrub is common in wet meadows in the subalpine zones and can be found along creeks to near the mouths of canyons in all of our mountains. AK to Lab., south to UT and NM.

This plant is similar to S. barclayi but the leaves are less hairy. Although Arthur Cronquist calls all of these plants from our area S. monticola, Robert Dorn has identified some of them as S. barclayi.

12. Salix farriae Ball

Farr's Willow

This shrub has stems, 30-150 cm (1-5 ft) tall, and yellowish to reddish-brown twigs that are finely hairy when young. The leaves have short petioles and elliptical to broadly lance-shaped blades, 3-6 cm (1-2 in) long, that have entire or minutely toothed margins and are yellowish green above and pale with a thin waxy coating beneath. Stipules are small and not persistent. Catkins are borne on short, leafy



r. *Salix scouleriana* s. *S. bebbiana* t. *S. rigida* u. *S. lasiandra* v. *S. drummondiana*

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stalks and appear with the leaves or soon after. The dark brown to black flower scales sometimes have a yellow base and are long-hairy on the inside and hairy or glabrous on the outside. Slender male catkins may be 2 cm long with 2 glabrous filaments per flower, while female catkins are up to 3 cm long. The glabrous capsules, 4-6 mm long, have short stalks and short styles and stigmas.

Farr's willow is locally common in wet meadows of the Sapphire Range at 1980-2285 m (6,500-7,500 ft). AK south to OR, ID, and WY.

13. Salix phylicifolia L. [S. planifolia Pursh]

Tea-leaved Willow

Tea-leaved willow is usually 0.5-2 m (20-80 in) tall with glabrous, shining, red to chestnut brown twigs. The leaves have petioles 3-10 mm long and elliptical to lance-shaped blades, 2-5 cm (1-2 in) long, narrowed to the base. The blades have entire or wavy margins and are glabrous above and have evident parallel veins and a thin, waxy coating below. Stipules are small and not persistent. The nearly sessile catkins may have a few leafy bracts at the base and appear with or just before the leaves. The blackish flower scales are covered with long hairs. Male catkins are 2-4 cm long with 2 anthers per flower and female catkins are 3-6 cm long. The short-hairy capsules have styles about 1-2 mm long with usually undivided stigmas half as long.

Var. monica (Bebb) Jeps., growing up to 2 m (6 ft) tall, is fairly common in wet meadows at 1830-2135 m (6,000-7,000 ft) in the Sapphire Range and was once collected in the Nez Perce Fork drainage of the Bitterroot Mountains at 1555 m (5,100 ft). Var. planifolia (Pursh) Hitt. is usually greater than 2 m tall and was once found at 1220 m (4,000 ft) near Gash Creek, west of Victor.

14. Salix myrtillofolia Anderss. [S. boothii Dorn]

Blueberry Willow

A shrub up to 4 m (13 ft) tall, blueberry willow has young twigs that are hairy and yellow to dark brown. The leaves have petioles less than 10 mm long and firm, elliptical to broadly lance-shaped blades, 2-8 cm (1-3 in) long, that are mostly rounded at the base, hairy at first but soon green and glabrous on both sides with entire to finely toothed margins. Stipules are small and not persistent. Catkins are borne on leafy stalks up to 15 mm long and appear with or slightly before the leaves. The brown to black flower scales are usually long-hairy. Male catkins are 1-2 cm long with 2 glabrous filaments per flower, and the female catkins are 2-4 cm long. The glabrous capsules, 3-6 mm long, have short stalks and short, nearly undivided stigmas.

In our area this species is known from a single 120 cm (4 ft) tall shrub at timberline on St. Joseph's Peak in the northern Bitterroot Mountains. AK to Newf. south to CA, UT, and CO.

15. Salix sitchensis Sanson

Sitka Willow

Sitka willow is up to 3 m (10 ft) tall with gray bark and young twigs that are yellowish brown at first, becoming densely grayish-hairy with age. The leaves have petioles, 5-15 mm long, and broadly lance-shaped blades, 4-9 cm (2-4 in) long, often with inrolled margins. Blades have dense, long, white hairs beneath but are green and only sparsely hairy above. Stipules are small on older branches but are leaf-like and persistent on younger growth. Catkins appear with or before the leaves on short, leafy-bracted stalks, and the brown to black flower scales are long hairy. The male catkins, 2-5 cm (1-2 in) long, have 1 stamen per flower, and the female catkins are 3-9 cm long. The densely hairy capsules are nearly sessile and the styles and stigmas are short.

Collections from Dam Creek Meadows in The Sapphire Range and lower Lost Horse Creek in the Bitterroot Mountains seem best referred to S. sitchensis, but male plants of this species could not be found. However, males of S. drummondii were present and the two species were probably hybridizing. Male plants of Sitka willow do occur along Elk Meadows Road at about 1830 m (6,000 ft). AK to CA, east to ID and MT.

16. Salix brachycarpa Nutt.

Short-fruited Willow

This is a low shrub, rarely more than 1.5 m (5 ft) tall, with dark red, young twigs that are densely covered with short hairs. The leaves have very short petioles and narrowly elliptical blades, rounded at the base and 2-3 cm long with entire margins. They have a thin waxy coating beneath and are hairy on both surfaces. Stipules are minute and not persistent. Numerous catkins, borne on short, leafy-bracted stalks, are crowded on the twigs and appear at the same time as the leaves. The light brown flower scales are hairy on both sides. The nearly globose male catkins are 6-15 mm long with 2 stamens per flower, and the female catkins are 15-20 mm long and nearly as wide. The hairy capsules are nearly sessile with styles longer than the 2-lobed stigma. Its catkins are dropped much later in the season, compared with most other Salix species at lower elevation.

Short-fruited willow is rare in our area, known only from a beaver pond along the East Fork of the Bitterroot River. It is locally common in wet, alkaline meadows south and east of our area. AK to Que., south to OR, UT, and CO.

Group V. These two species are dwarf, prostrate plants with stems buried in the surface of the soil of alpine summits in the Bitterroot Mountains. The catkins that project only inches above the ground are a favorite food of blue grouse.



w. *Salix geyeriana* x. *S. commutata* y. *S. monticola* z. *S. farriac* a. *S. phyllifolia* b. *S. myrtilifolia*

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17. Salix nivalis Hook. [S. reticulata L.]

Snow Willow

Snow willow forms mats with stems that are rarely more than 4 cm (1-2 in) high. The leaves have petioles 2-7 mm long and entire, elliptical blades up to 25 mm long that are shiny, dark green above and veiny with a pale waxy coating beneath. Stipules are minute or lacking. Catkins, borne on slender stalks at the ends of the new branches, appear after the leaves have come out. The yellowish or pale green flower scales are long-hairy on the inside surface. Both male and female catkins are up to 1 cm long, and the males are very slender. The long-hairy capsules are 3-5 mm long with styles shorter than the 2-lobed stigmas.

Snow willow occurs in cool, moist, sparsely vegetated habitats on a few summits above 2805 m (9,200 ft) in the southern Bitterroot Mountains. It is often associated with Luzula spicata, Lloydia serotina, Silene acaulis, and Lewisia pygmaea. B.C. to CA, east to Alta., UT, and NM.

The plant is closely related to and often considered conspecific with the circumboreal S. reticulata.

18. Salix arctica Pall.

Arctic Willow

Arctic willow has glabrous to pubescent branches that are yellowish to purplish-black. It forms loose mats or has trailing stems and may occasionally be as high as 6 cm (2 in). The leaves have petioles 3-8 mm long with egg-shaped to narrowly elliptical blades, up to 4 cm (1 in) long, that are glabrous above and veiny with a thin waxy coating beneath. Stipules are minute or lacking. The dark brown to black flower scales are long-hairy on both surfaces. Male and female catkins are up to 5 cm (2 in) long and borne on leafy side branches. The densely hairy capsules have styles that are much longer than the deeply 2-lobed stigmas.

This willow has been found in the southern Bitterroot Mountains on West Como Peak with S. nivalis and on El Capitan with Caltha leptosepala. Circumboreal, south to CA, NM, and Que.

This species can be distinguished from S. nivalis by the larger, less compact growth form and erect catkins with blackish scales.

SANTALACEAE Sandalwood Family

Comandra Nutt. Bastard Toadflax

Comandra umbellata (L.) Nutt.

Pale Bastard Toadflax

Pale bastard toadflax is a rhizomatous perennial with small clusters of often branched, leafy stems 10-35 cm (4-14 in) tall. The light green or waxy-coated, alternate leaves, 15-30 mm long, have short petioles and are linear to elliptical with a pointed tip. Numerous small bisexual flowers are borne in flat-topped clusters at the ends of the stems. Petals are lacking, and the 5-lobed, bell-shaped, white to purplish calyx surrounds the ovary. There are 5 stamens shorter than the sepals. The berry-like fruit, 4-8 mm long with the dried calyx lobes on top, is green at first but turns purple with age.

This plant is common and widespread in dry grasslands and shrublands from the valleys occasionally to the subalpine zone. Our plants are var. pallida (DC.) Jones. Much of North America north of Mex.

Bastard toadflax has roots that attach to the roots of other plants in order to extract water and nutrients from them. It is known to have a wide range of hosts.

SAXIFRAGACEAE Saxifrage Family

Members of this family are perennial herbs with mostly simple, alternate or basal leaves. Flowers are bisexual and radially symmetrical (star- or circular-shaped). They are solitary at the ends of stems or borne in narrow, unbranched to profusely branched, flat-topped inflorescences. The 4-5 sepals are united below with the lower portion of the ovary to form a saucer- to urn-shaped hypanthium. The 4-5 petals are distinct and entire (except Lithophragma) or lacking. There are 4-10 stamens and usually 2 pistils (ovaries and styles). The ovary and calyx are partially united at the base. The fruit is a mostly 2-parted capsule.

- | | | |
|----|---|---------------------|
| 1. | Leaves glabrous with smooth, hairless margins..... | <u>Parnassia</u> |
| 1. | Leaves not as above..... | 2 |
| 2. | Petals deeply divided into linear segments..... | 3 |
| 2. | Petals with entire margins, not divided..... | 4 |
| 3. | Leaf blades divided >1/2 way to the midvein..... | <u>Lithophragma</u> |
| 3. | Leaf blades merely shallowly lobed <1/2 way to midvein..... | <u>Mitella</u> |
| 4. | Stamens 10..... | 5 |
| 4. | Stamens 4 or 5..... | 6 |



c. *Salix sitchensis* d. *S. brachycarpa* e. *S. nivalis* f. *S. arctica* g. *Comandra umbellata*

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5. Petals linear to filiform, ca. as wide as the anther stalks; ovary with two lobes of very unequal size.....Tiarella
5. Petals wider; ovary with equal lobes.....Saxifraga
6. Sepals and stamens 4; stems prostrate.....Chrysosplenium
6. Sepals and stamens 5 on most flowers.....7
7. Stem leaves absentHeuchera
7. Stem leaves present.....8
8. Basal leaves <5 cm (2 in) wide.....Suksdorfia
8. Basal leaves mostly >5 cm wide.....Boykinia

Boykinia Nutt. Boykinia

Boykinia major Gray

Mountain Boykinia

This is a perennial herb with scaly rhizomes and coarse, erect stems up to 80 cm (32 in) tall that are slightly glandular-hairy. The lower leaves have petioles 10-20 cm (4-8 in) long and broadly spade-shaped blades up to 20 cm broad that are deeply 3-7 times divided into sharply toothed lobes. The upper leaves have shorter petioles and leaf-like wings at the their base. The numerous white or cream-colored flowers are borne in densely branched, flat-topped inflorescences at the top of the stem or from the upper leaf axils. The bell-shaped calyx is 5-6 mm long, and the petals are broadly spoon-shaped and 4-6 mm long.

Mountain boykinia is locally common in moist or wet, open to shaded habitats along streams in the montane zone and less frequently as high as the upper subalpine zone. It occurs at 2500 m (8,200 ft) on Ward Mountain west of Hamilton. It is found from the Clark Fork River south along the Montana-Idaho border through the Bitterroot Mountains to the Continental Divide. Our plants are var. major. WA to CA, east to ID and W. MT.

Chrysosplenium L. Golden Carpet

Chrysosplenium tetrandrum (Lund) Fries

Northern Golden Carpet

Northern golden carpet is a semi-aquatic, perennial herb with lax stems up to 15 cm (6 in) long that are leafless below and profusely branched above with erect tips. Basal leaves have petioles and broadly spade-shaped blades, 5-10 mm wide, with shallowly round-lobed margins. Stem leaves are similar with shorter petioles. The greenish flowers are 3 mm broad and borne in the axils of the upper leaves. The petals are lacking, and the 4 spreading sepals are egg-shaped and yellowish on the inner surface.

This inconspicuous plant occurs on a wet, mossy bank in the northern Sapphire Range and along Laird Creek near Sula. Circumpolar, south in North America to CO.

Heuchera L. Alumroot

Members of this genus are perennial herbs with slender, erect, leafless stems from scaly, creeping rootstocks and a branched crown. Basal leaves have petioles with membranous appendages fused to the base and blades that are palmately lobed and toothed. The short-stalked flowers are borne in long, narrow, terminal inflorescences. The saucer- to bell-shaped calyx has 5 lobes, and the 5 small petals (sometimes lacking) are entire-margined and greenish, white, or pinkish. The 5 stamens are opposite the sepals. Fruit is a 1-celled capsule with 2 elongated, divergent, hollow beaks.

1. Calyx saucer-shaped, 2-3 mm long with all the lobes of equal length.....(3) H. parvifolia
1. Calyx bell-shaped, >3 mm long with some lobes longer than others.....2
2. Petals 5, present on all flowers and nearly as long or longer than the sepals..(1) H. grossulariifolia
2. Petals often <5 or lacking, usually 1/2 as long as sepals.....(2) H. cylindrica

1. Heuchera grossulariifolia Rydb.

Gooseberry-leaved Alumroot

This species has mostly bractless stems, 12-35 cm (5-14 in) tall, that are glandular-hairy throughout or only in the upper portion. The glabrous leaf blades are nearly orbicular to broadly spade-shaped, 10-35 mm wide, and 3- to 5-lobed with coarsely toothed margins beset with stiff hairs. The inflorescence is 1-6 cm (0.5-2 in) long with 2- to 6-flowered, nearly erect branches up to 15 mm long. The long, bell-shaped calyx has erect lobes and is slightly longer on one side than the other. The white petals are narrowly spoon-shaped and shorter to longer than the sepals. The incurved stamens are shorter than the sepals. The style is less than 1 mm long.

Gooseberry-leaved alumroot is common in well-drained, dry habitats such as cliffs and rockslides in the open to partial shade from the valleys up to timberline. It occurs at 2285 m (7,500 ft) on Lolo Peak, west of Lolo and at 2725 m (8,950 ft) on the Heavenly Twins, west of Stevensville. WA and OR, east to ID and MT.

Plants occurring near timberline south of Lost Horse Creek in the Bitterroot Mountains are distinctive, with pinkish flowers and reddish stems. The numerous basal leaves have petioles 3-20 mm long and purplish-brown tinged blades 4-16 mm wide. The stems are up to 18 cm (7 in) tall with the inflorescence usually less than 4 cm (1 in) long. This form has been collected on the north slope of Sugarloaf Peak Mount Jerusalem, and above Chaffin Lakes at 2500-2775 m (8,200-9,100 ft).

2. Heuchera cylindrica Dougl.

Roundleaf Alumroot

Roundleaf alumroot has stems, 15-45 cm (6-18 in) tall, that are glabrous to glandular below and glandular-hairy above. The stems are naked or with 1-3 membranous, brown to green, leaflike bracts. Basal leaves have densely white-hairy petioles that are 5-12 cm (2-5 in) long and often curved. The leathery blades are often shiny, nearly glabrous above, and soft-hairy on the veins beneath. They are 2-5 cm (1-2 in) long with a heart-shaped base and 5-7 rounded and toothed lobes. The short-stalked flowers are borne in a narrow inflorescence, 4-9 cm (2-4 in) long. The calyx is densely hairy below and yellowish-green above with unequal lobes. Petals are lacking or shorter than the sepals. The capsule is 6-10 mm long.

Our plants are var. glabella (T. & G.) Wheelock. They are common in dry, rocky, open to shaded habitats from the valleys to near timberline, more commonly in the Sapphire Range than in the Bitterroot Mountains. B.C. to CA, east to Alta., WY, and NV.

Intergradient forms between var. glabella and var. cylindrica occasionally occur in the northern part of our area.

3. Heuchera parviflora Nutt.

Small-leaved Alumroot

This species has bractless stems up to 30 cm (12 in) tall and mostly glandular-hairy herbage. The leaves have petioles 4-10 cm (1-4 in) long and shallow to deeply lobed blades, 1-4 cm wide, that are round-toothed with stiff hairs on the margins. The inflorescence is compact at first, but the branches become more widely spreading as the plant matures. The green or yellowish calyx is saucer-shaped. The minute, white or yellowish petals are slightly greater than the sepals, while the incurved stamens are shorter than the sepals. Mature capsules are 4-7 mm long.

In our area, small-leaved alumroot is the only member of the genus to occur in vernal moist soil of grassy slopes in the foothills to subalpine balds. It also occurs in rocky habitats, but it is rare in the Bitterroot Mountains. Alta. south to NV, AZ, and NM.

Lithophragma Nutt. Fringecup, Prairie Star

These are slender, perennial herbs with usually glandular, unbranched stems. The rootstocks often bear bulbs. The mostly basal leaves have petioles with a swollen base and divided or lobed blades. The showy, short-stalked flowers are borne in a flat-topped to narrow, few-flowered inflorescence. The calyx is cup- or bell-shaped with 5 shallow lobes. The 5 white to pink petals are lobed or deeply divided. There are 10 stamens and 3 styles. The fruit is a 3-chambered capsule.

- | | | |
|----|---|--------------------------|
| 1. | Basal leaves glabrous or only very sparsely hairy..... | 2 |
| 1. | Basal leaves hairy, at least on lower surfaces..... | 3 |
| 2. | Stem leaves with small bulbs in the axils..... | (2) <u>L. bulbifera</u> |
| 2. | Stem leaves lacking bulbs in the axils..... | (1) <u>L. glabra</u> |
| 3. | Calyx long-tapering to the base, 4-6 mm long at flowering and 6-10 mm long in fruit; petals mostly 3-lobed..... | (3) <u>L. parviflora</u> |
| 3. | Calyx more bell-shaped, 2-3 mm long in flower and 3-5 mm long in fruit; petals usually 5-lobed..... | (4) <u>L. tenella</u> |

1. Lithophragma glabra Nutt.

Smooth Fringecup

Smooth fringecup has stems up to 30 cm (12 in) tall and herbage covered with purple-tipped glandular hairs. The basal leaves often have small bulbs in their axils, and the blades are 5-30 mm wide and deeply divided into 3-5 segments that are again shallowly lobed. The usually 2 stem leaves are sessile or nearly so. The 2- to 5-flowered inflorescence is flat-topped in bloom but elongated in fruit. The calyx is 3-4 mm long (to 6 mm in fruit) with broadly triangular lobes. The white to pinkish petals are up to 12 mm long, club-shaped at the base, and deeply divided into 3 or usually 5 segments that are entire or again deeply lobed. The ultimate segments are nearly linear.

The plant occurs in vernal moist soil of warm slopes in the foothills throughout our area. WA and OR, east to ID and MT.

This species flowers earlier than other members of the genus, usually in the last days of March.

2. Lithophragma bulbifera Rydb.

Rockstar

Rockstar is similar to L. glabra, but it has up to 5 stem leaves with small bulbs in the axils. The inflorescence is longer and often has bulbs in place of flowers. The entire plant is frequently reddish-purple.

SAXIFRAGACEAE

This species is common in the same habitats as L. glabra, but it may occur as high as timberline. It often occurs with L. glabra, and the two often intergrade. B.C. to CA, east to Alta., SD, and CO.

3. Lithophragma parviflora (Hook.) Nutt.

Small-flowered Fringecup

With stems up to 40 cm (16 in) tall, this plant is glandular-hairy above. There are 1-several stem leaves, the upper ones sessile. Basal leaves have petioles 1-6 cm long and blades 1-3 cm wide that are divided to the base into 3-5 segments that are 2-3 times lobed. The 3-10 flowers are borne in an inflorescence that is congested at first but later may expand up 15 cm (6 in) long. The bell- to cone-shaped calyx is 3-5 mm long at flowering time, becoming longer in fruit. The white or slightly pinkish petals have club-shaped bases as long as the sepals and blades that are 4-10 mm long and deeply divided into 3-5 segments.

Small-flowered fringecup is common in vernal moist, well-drained soil of grassy slopes and open forest in the valley and montane zones. B.C. to CA, east to Alta., SD, and CO.

4. Lithophragma tenella Nutt.

Slender Fringecup

Slender fringecup has glandular-hairy herbage and stems 10-20 cm (4-8 in) tall. The leaf blades are mostly deeply 3(5)-lobed, these again shallowly lobed or toothed. The 2-3 stem leaves lack bulbs in the axils and are dissected into linear segments, the petioles short or lacking. The 5-10 flowers are borne in an inflorescence that is congested at first but becomes narrow and elongated. The bell-shaped calyx is 2-3 mm long in flower and 5 mm long in fruit. The white to slightly pinkish petals are 5-lobed, the outer 2 smaller than the inner 3.

An uncommon plant known from montane meadows in southwestern Ravalli County. WA and OR, east to MT, CO, and AZ.

Mitella L. Mitrewort

Mitreworts are rhizomatous, perennial herbs with slender, naked, or few-leaved stems. The small, stalked flowers are borne in narrow, unbranched, terminal inflorescences. The 5-lobed calyx is saucer- to cone-shaped, and the 5 greenish, white, or pinkish petals are narrow with filiform appendages on the upper portion. There are 5 or 10 stamens, and the short style is entire or 2-lobed. The fruit is a 1-celled capsule with numerous, small, shiny, black seeds.

All species occur in canyons and on forested slopes.

- | | | |
|----|---|----------------------------|
| 1. | Flowers with 10 stamens..... | (4) <u>M. nuda</u> |
| 1. | Flowers with 5 stamens..... | 2 |
| 2. | Upper flowers blooming before lower ones; usually with 1-3 leaves on the stem..... | (5) <u>M. caulescens</u> |
| 2. | Lower flowers blooming before those above; stems usually without true leaves..... | 3 |
| 3. | Stamens attached directly below the base of the petals..... | (2) <u>M. pentandra</u> |
| 3. | Stamens attached below the apex of the sepals, to one side of the base of petals..... | 4 |
| 4. | Petals divided into at least 5 segments in the upper portion..... | (3) <u>M. breweri</u> |
| 4. | Petals divided into 3 lobes at the tip..... | 5 |
| 5. | Flowers borne on 1 side of the inflorescence; calyx mostly 4-6 mm long; petals divided into filiform segments at the tip..... | (1) <u>M. stauiopetala</u> |
| 5. | Inflorescence not noticeably 1-sided; calyx mostly <4 mm long; lobes of petals narrow but not filiform..... | (6) <u>M. trifida</u> |

1. Mitella stauiopetala Piper

Side-flowered Mitrewort

The usually several, naked stems of this species are up to 35 cm (14 in) tall, finely hairy below, and minutely glandular above. Basal leaves have petioles 3-10 cm (1-4 in) long and nearly orbicular blades, 2-6 cm wide, that have scalloped margins and are white hairy and often purple-tinged. The 10-30 flowers are borne on one side of the stem and begin blooming at the bottom. The cone-shaped calyx is 4-6 mm long with erect and divergent lobes. The white or pinkish-purple petals are dissected into 3 filiform segments.

Side-flowered mitrewort is common in dry to moist, well-drained habitats mainly in the montane zone but also into the lower subalpine. Eastern WA and OR, east to MT, UT, and CO.

2. Mitella pentandra Hook.

Alpine Mitrewort

Alpine mitrewort has naked or membranous-bracted stems 8-30 cm (3-12 in) tall. The basal leaves have long, slender petioles and spade-shaped, sparsely to densely hairy blades, 1-4 cm (0.5-2 in) wide, that are weakly lobed and toothed. The 5-20 flowers are borne in a narrow inflorescence. The calyx, saucer- shaped in flower but becoming cup-shaped in fruit, has spreading or recurved, triangular lobes. The greenish petals have 4-10 divergent, filiform appendages resembling a 2-sided comb along the upper portion.



a. *Boykinia major* b. *Chrysosplenium tetrandrum* c. *Heuchera grossularifolia* d. *H. cylindrica*
e. *Heuchera parviflora* f. *Lithophragma glabra* g. *L. bulbifera* h. *L. parviflora* i. *L. tenella*

SAXIFRAGACEAE

This species occurs in moist soil, infrequently in montane creek bottoms but becoming common in the subalpine zones as high as the upper reaches of the spruce-fir forest. AK to CA, east to Alta. and CO.

3. Mitella breweri Gray

Brewer's Mitrewort

The stems of this species are 10-25 cm (4-10 in) tall and naked or with 1-3 membranous bracts. Basal leaves have petioles 4-10 cm (1-4 in) long and mostly glabrous blades, 2-7 cm (1-3 in) wide, that are nearly round with shallowly toothed margins and a deep sinus where the petiole is attached. The 10-40 flowers are borne in a long, narrow inflorescence that begins blooming at the base. The saucer-shaped calyx has pointed, triangular lobes that are spreading to reflexed. The linear petals, 1-2 mm long, are dissected into 2-4 pairs of lateral, filiform appendages resembling a 2-sided comb.

Brewer's mitrewort is common in moist, usually shaded, montane and subalpine habitats such as alder thickets. It is common throughout our area but is most common in the Bitterroot Mountains. B.C. to CA, east to Alta. and W. MT.

4. Mitella nuda L.

Bare-stemmed Mitrewort

This is a dwarf, often stoloniferous, trailing plant with naked stems up to 10 cm (4 in) tall. The broadly spade-shaped leaf blades are 1-3 cm wide with weakly lobed and wavy margins. The 3-10 flowers are borne on stalks, 2-6 mm long, in a narrow inflorescence. The saucer- to bell-shaped calyx has triangular lobes as long as the tube. The greenish-yellow petals are about 4 mm long and dissected into 4 pairs of lateral, filiform appendages resembling a 2-sided comb.

Bare-stemmed mitrewort is infrequent on moist, mossy banks and swampy habitats in the montane and lower subalpine zones of the Sapphire Range and at the north end of the Bitterroot Mountains along McClain Creek and the South Fork of Lolo Creek. AK to Newf., south to WA, MT, MN, and PA; Asia.

This is our only species with 10 stamens.

5. Mitella caulescens Nutt.

Leafy Mitrewort

Leafy mitrewort often forms runners and has glandular-hairy stems 15-25 cm (6-10 in) tall. The basal leaves have long petioles and spade-shaped blades, 3-6 cm (1-2 in) wide, with 3-7 lobes that are shallowly toothed. The 1-3 stem leaves are greatly reduced upward. Flowers are borne in a long, loose inflorescence, and blooming begins at the top. The saucer-shaped calyx is 5-6 mm wide and has spreading, yellowish-green lobes. The petals are purplish at the base and divided above into 3-5 pairs of lateral, filiform appendages resembling a 2-sided comb.

This plant is uncommon in our area, known from moist, shaded habitats below 1370 m (4,500 ft) at McClain Creek and the foot of Lantern Mountain in the northern Bitterroot Mountains. B.C. to CA, east to ID and W. MT.

The foliage of this species resembles that of Tiarella trifoliata.

6. Mitella trifida Grah.

Three-tooth Mitrewort

This plant has clustered stems, 15-25 cm (6-10 in) tall, that are naked or have 1-3 reduced leaves or membranous bracts. Leaves have petioles covered with backward-pointing hairs and broadly spade-shaped blades with shallowly lobed and scalloped margins. The 6-18 flowers bloom upwards on the elongating inflorescence. The broadly bell-shaped calyx has erect to spreading, whitish lobes. The white or purplish petals are divided into 3 short lobes at the tip.

This mitrewort was collected from a moist forested site in the lower Rattlesnake Creek drainage. It is more common east of the Continental Divide. B.C. to CA, east to Alta. and MT.

Parnassia L. Grass of Parnassus

These are glabrous, perennial herbs with solitary flowers on erect stems arising from short rootstocks. The clustered basal leaves are entire-margined and petiolate, and the single stem leaf is sessile or lacking. The 5 sepals are united at the base, and the 5 white, narrowly elliptical petals have greenish or yellowish veins. There are 5 functional stamens, and the 4 stigmas are nearly sessile on the ovary. In front of each petal there is a petal-like sterile stamen that is divided into 5-several, sometimes gland-tipped lobes at the tip.

1. Petals fringed along both sides of lower half; leaves joined abruptly to the petiole..(1) P. fimbriata
1. Petals not fringed; leaves tapered to the petiole.....(2) P. kotzebuei

1. Parnassia fimbriata Konig

Fringed Grass of Parnassus

This familiar plant has stems, 12-30 cm (5-12 in) tall, with a sessile, spade-shaped leaf near mid-length. The basal leaves have petioles, 3-10 cm (1-4 in) long, and broadly spade-shaped blades with prominent, parallel nerves. The calyx lobes are elliptical with fringed tips, and the petals are 8-12 mm long with 5-7 prominent, parallel veins and long, filiform fringes on both sides near the base. The sterile stamens have 5-9 blunt, glandless lobes. The egg-shaped capsule is about 1 cm long.



j. *Mitella stauropetala* k. *M. pentandra* l. *M. breweri* m. *M. nuda* n. *M. caulescens* o. *M. trifida*
p. *Parnassia fimbriata*

SAXIFRAGACEAE

Fringed grass of Parnassus is common along streams and springs and in bogs and wet meadows from the montane zone to timberline in all of our mountains. It flowers from late summer to early fall. AK to CA, east to Alta., CO, and NM.

2. Parnassia kotzebuei Cham. & Schlecht.

Kotzebue's Grass of Parnassus

This dwarf species has single (2-3), usually leafless stems up to 10 cm (4 in) tall. Basal leaves have widened petioles and rounded-triangular to broadly elliptical blades that taper to the base. The lance-shaped sepals have mostly 3 nerves, and the unfringed, elliptical petals are about 7 mm long. The sterile stamens have 4-6 often gland-tipped lobes. The fruit is a capsule less than 1 cm long.

This arctic-alpine plant is known only from the north slope of Sugarloaf Peak at 2515 m (8,250 ft) in the southern Bitterroot Mountains. AK to Greenl., south to WA, NV, WY, and Lab.; Asia.

Saxifraga L. Saxifrage

The saxifrages are glabrous or, more often, glandular-hairy perennials with simple to divided leaves that are basal or alternate (opposite in 1 species) and sometimes have small bulbs in the axils. Flowers (sometimes replaced by small bulbs) are solitary or borne on stalks in a simple to branched inflorescence. The 5-lobed calyx is saucer- to bell-shaped, and there are 5 petals. There are 10 stamens; the anther stalks (filaments) often petal-like. The fruit is a 2-chambered capsule narrowed to 2 distinct, divergent or erect beaks with numerous small seeds.

A number of the species (Group I) are very similar and difficult to distinguish.

1. Petals purple; leaves opposite.....(13) S. oppositifolia
1. Petals white or lacking; leaves alternate or all basal (1 species may have purple petals, but leaves are all basal).....2
2. Leaf blades round or nearly so in outline with lobes or toothed margins and distinct petioles.....3
2. Leaf blades definitely longer than wide, mostly tapered gradually to the petiole.....6
3. Plants <7 cm (3 in) tall with leaves <2 cm wide.....(11) S. debilis
3. Plants mostly >7 cm tall with leaves >2 cm wide.....4
4. Leaf blades tapered to the petiole, usually fan-shaped.....(14) S. lyallii
4. Leaf blades nearly orbicular, indented at the base and abruptly joined to the petiole.....5
5. Leaf blades with 3-toothed, shallow lobes along the margins.....(4) S. mertensiana
5. Leaf blades with only 1 series of teeth along the margins.....(8) S. arguta
6. Leaves awl-shaped with a sharp-pointed tip; plants mosslike.....(9) S. bronchialis
6. Leaves otherwise; plants not mosslike.....7
7. Leaves usually over 16 mm (0.7 in) long; flowering stems often leafless.....8
7. Leaves <15 mm long; flowering stems with at least 1 leaf.....14
8. Leaves fan- or strap-shaped; leaf blades uniformly tapered to the petiole.....9
8. Leaves usually somewhat lance-shaped; blades somewhat abruptly tapered to the petiole.....10
9. Plants glabrous or nearly so; stems often deep red.....(14) S. lyallii
9. Plants densely hairy and glandular above.....(3) S. ferruginea
10. At least 2/3 of the ovary projecting above the top of the calyx tube at flowering..(2) S. occidentalis
10. At least 1/2 of the ovary united to and surrounded by the calyx tube at flowering.....11
11. Leaf blades >5 cm (2 in) long.....(5) S. oregana
11. Leaf blades mostly <5 cm long.....12
12. Leaves with definite teeth on the margins.....(6) S. rhomboidea
12. Leaves with entire or minutely toothed margins.....13
13. Petals usually >1.5 mm long; plants lower subalpine and below.....(1) S. integrifolia
13. Petals usually <1.5 mm long; plants near timberline and above.....(7) S. tempestiva
14. Leaves lobed at the tip.....(12) S. caespitosa
14. Leaves entire or minutely toothed on the margins.....15
15. Petals >2 mm long; plants often forming mats with prostrate, leafy, sterile stems.....(10) S. tolmiei
15. Petals 0.5-1.5 mm long; plants with only basal leaves, not forming mats.....(7) S. tempestiva

Group I. All of these species have single, erect stems with a terminal inflorescence. They occur in open, moist or vernal moist habitats from the foothills to above timberline.

1. Saxifraga integrifolia Hook.
[S. apetala Piper]

Columbia Saxifrage

Columbia saxifrage has leafless stems up to 20 cm (8 in) tall from a short rootstock or rhizome. The stems are glandular-hairy above and glabrous to hairy below, often with small bulbs at the base of the stem or among the leaves. The leaves have broad petioles and broadly lance-shaped blades, 1-6 cm long, that have entire to wavy margins and tangled, rust-colored hairs beneath. Few to many flowers are borne in a linear-bracted, congested to partly open inflorescence that becomes more open with age. The dull green calyx is often tinged with red and has reflexed or spreading lobes. The petals, which may fall early or be entirely lacking, are greenish-white and narrower than the sepals. Anthers are reddish-orange or yellow, and the beaks of the ovary are reddish and 3-5 mm long at maturity.

Var. leptosepala (Suksd.) Engl. & Immsch. with petals, orange anthers, and a moderately open inflorescence is common in open, vernal moist habitats in the foothills, but may occur up to the subalpine. Var. apetala (Piper) Jones lacks petals and has a congested, globose inflorescence and yellow anthers. It is known from moist rock outcrops in the foothills of the Bitterroot Mountains west of Hamilton. B.C. to CA, east to MT and NV.

Plants of var. leptosepala occurring at higher elevations often appear transitional to S. occidentalis and S. rhomboidea as well as other varieties of S. integrifolia.

2. Saxifraga occidentalis Wats.
[S. marshallii Greene]

Western Saxifrage

This saxifrage has 1-2 glandular-hairy stems up to 20 cm (8 in) tall from short, horizontal rhizomes. The spreading basal leaves have slender to slightly winged petioles and fleshy, oval to elliptical blades that are distinctly wavy-margined and often have reddish hair beneath. Flowers are borne in a congested to open, pyramidal inflorescence. The calyx has egg-shaped to oblong, spreading or reflexed lobes, 1-3 mm long. Petals are about as long as the sepals. The capsules are contracted below and have two reddish beaks.

Var. idahoensis (Piper) Hitchc. has club-shaped, petal-like anther stalks, petals with 2 yellow spots at the base, and an open pyramidal inflorescence. It is common on vernal wet, mossy rocks, often in partial shade in the montane and lower subalpine zones. Var. occidentalis has narrow anther stalks, unspotted petals, and a congested inflorescence. It is mostly a plant of exposed habitats of the subalpine to alpine zones. B.C. to OR, east to Alta., WY, and NV.

Small plants of var. occidentalis from Trapper Peak could be confused with S. tempestiva, while taller plants with more open inflorescences appear intergradient with var. idahoensis or S. integrifolia. Plants with a very compact inflorescence often resemble S. rhomboidea.

3. Saxifraga ferruginea Grah.

Rusty Saxifrage

The stems of this plant, up to 25 cm (10 in) tall, are glandular above and soft-hairy below and arise from a short, thick rootstock. The densely clustered, hairy, basal leaves have broadly winged petioles and spatula-shaped blades, up to 6 cm (2 in) long, with prominently toothed margins. Flowers are borne in a narrow-bracted, open inflorescence with ascending branches. Many of the lower branches often bear tiny plantlets instead of flowers. The calyx has reddish, reflexed lobes about 2 mm long. The white petals are 4-6 mm long; the upper 3 are larger with yellow spots at the base.

Rusty saxifrage is locally common and at the southwestern edge of its range in the Bitterroot Mountains. It occurs on vernal wet, mossy rocks and seeps, mostly in the montane and lower subalpine zones but occasionally up to timberline. Our plants are var. macounii Engl. & Immsch. AK to CA, east to Alta. and MT.

4. Saxifraga mertensiana Bong.

Merten's Saxifrage

Merten's saxifrage has stems that are finely hairy, minutely glandular, and up to 20 cm (8 in) tall with a scaly and bulb-bearing rootstock. The succulent and sparsely hairy to glabrous basal leaves have hairy petioles, 3-10 cm (1-4 in) long, and nearly orbicular blades, 2-6 cm wide, with shallow, toothed lobes. There are usually 1-3 similar leaves on the base of the stem. The stalked flowers are borne in an open, branched inflorescence with many of the lower branches bearing tiny plantlets in place of flowers. The calyx is deeply divided into narrow, reflexed lobes. The white, elliptical petals are 3-5 mm long, and the anthers are pinkish with club-shaped stalks.

This widespread but infrequent plant occurs in moist but well-drained habitats in the subalpine and timberline zones along the Selway-Bitterroot Divide. AK to CA, east to Alta., MT, and ID.

5. Saxifraga oregana Howell

Bog Saxifrage

Bog saxifrage has glandular-hairy stems up to 60 cm (2 ft) tall from a thick rootcrown. The leaves have short, winged petioles and glabrous to sparsely hairy, broadly lance-shaped blades with entire or shallowly toothed margins. The inflorescence is congested to open and narrowly branched. The calyx tube is cone-shaped with triangular lobes. Petals are greenish to white (lacking) and unequal in size.

SAXIFRAGACEAE

Var. montanensis (Small) Hitchc. is 25-60 cm (10-24 in) tall with a branched inflorescence and has greenish sepals, anther filaments, and petals. It is locally common in bogs and swamps in the montane and lower subalpine zone in all of our mountains.

Var. subapetala (E. Nels.) Hitchc. is smaller with a more spikelike inflorescence and purplish sepals and anther filaments. Petals are small and purplish or lacking. It is infrequent on ledges and permanently moist meadows in the subalpine and timberline zones in the southern Bitterroot Mountains.

The species as a whole occurs from WA to CA, east to MT, WY, and CO. These two varieties are sharply distinct in habitat and morphology. Intermediates between them do not occur in western Montana.

6. Saxifraga rhomboidea Greene

Diamondleaf Saxifrage

The stems of this species are 5-15 cm (2-6 in) tall and densely glandular with red- or yellow-tipped hairs. The leaves have broadly winged petioles and leathery, broadly lance-shaped blades that have toothed margins and are bright green above and often purple below with rust-colored hairs. Flowers are borne in a congested head, occasionally with the lowest branches separate. The narrowly elliptical sepals are up to 2 mm long and spreading or reflexed. The white petals are spoon-shaped and surpass the sepals. The anther filaments are broadly awl-shaped and slightly petal-like. The reddish capsule has 2 short, recurved beaks.

Diamondleaf saxifrage is known from bare ridgetops in the upper subalpine zone of the Sapphire Range and from Lolo Peak in the northern Bitterroot Mountains. B.C. and Alta., south to CO and UT.

This species appears to intergrade with S. occidentalis var. occidentalis and forms of S. integrifolia. Many collections from the Bitterroot Mountains are these intergrading forms.

7. Saxifraga tempestiva Elvander & Denton

Storm Saxifrage

Storm saxifrage has glabrous to sparsely glandular-hairy stems, mostly less than 8 cm (3 in) tall, from a simple or branched rootcrown that may have a few small bulbs in the old leaf axils. The glabrous leaves have an indistinct, broad petiole and linear to egg-shaped blades up to 3 cm (1 in) long. The 1-8 flowers are subtended by linear bracts and borne in a congested, globose to flat-topped inflorescence. The purple or purple-tipped, egg-shaped sepals are spreading to erect, and the linear, white petals, about 1 mm long, are shorter than the sepals. The orange anthers are borne on white filaments.

A rare Montana alpine endemic, this species is infrequent beneath alpine larch at 2375 m (7,800 ft) on East St. Joseph Peak in the northern Bitterroot Mountains. Southwest MT. (Not illustrated).

Group II. These species occur in bogs, wet meadows, along streams and other habitats with ample, permanent moisture.

5. Saxifraga oregana Howell

Bog Saxifrage

Var. montanensis (Small) Hitchc. is locally common in bogs and swamps in the montane and lower subalpine zones. See description above.

8. Saxifraga arguta D. Don

Brook Saxifrage

[S. odontoloma Piper]

This rhizomatous species has naked, solitary stems, 14-20 cm (5-8 in) tall, that are hairy above with purple or red glands. The leaves have slender petioles, widened at the base, and nearly orbicular blades, 2-8 cm (1-3 in) wide, with wavy margins and gland-tipped teeth. Flowers are borne at the end of purplish branches in an open inflorescence. The purplish, lance-shaped sepals are reflexed, and the white petals are 3-4 mm long and broadly club-shaped. The anthers filaments are white and petal-like.

This is a common plant along creeks and streams in the subalpine zones, less common lower or higher. It is often associated with Mimulus lewisii, Senecio triangularis, and Mertensia ciliata. AK to CA, east to Alta. and NM.

Group III. A single species of mostly dry, often exposed, rocky habitats from lower canyons to the highest elevations.

9. Saxifraga bronchialis L.

Spotted Saxifrage

Spotted saxifrage is a mat-forming perennial with stems up to 12 cm (5 in) tall and old, brown, persistent leaves at the base. The narrowly lance-shaped, spine-tipped leaves have spreading hairs on the margins and are mostly crowded at the base of the stems, giving the plant a mosslike appearance. The flowers are borne in an open inflorescence with few, short, ascending branches. The saucer-shaped calyx has egg-shaped lobes, 1-3 mm long, and the white petals are orange- or purple-spotted and about twice as long as the sepals. The white anther filaments are club-shaped and petal-like. The capsules are 6-10 mm long.

Our plants are var. austromontana (Wieg.) G. N. Jones. This species is common in the Bitterroot Mountains and occurs in all of our mountains. Circumpolar, south in North America to OR and NM.



q. *Parnassia kotzebuei* r. *Saxifraga integrifolia* s. *S. occidentalis* t. *S. ferruginea* u. *S. mertensiana*
v. *Saxifraga oregana* w. *S. rhomboidea* x. *S. arguta* y. *S. bronchialis*

SAXIFRAGACEAE

Group IV. The following species occur only near or above timberline. They are not particularly similar in appearance but are distinct and easy to identify.

10. Saxifraga tolmiei T. & G.

Alpine Saxifrage

A low, mat-forming species with short, leafy, nearly prostrate, sterile stems and leafless, flowering stems up to 7 cm (3 in) long. The spoon-shaped leaves are glabrous with entire, rolled-under margins. The dried remains of old leaves are retained at the base of each stem. The 1-5 flowers are borne in an open, few-branched inflorescence. The glabrous, purple-tinged calyx has spreading, egg-shaped lobes, 2-3 mm long, and the white petals are spoon-shaped. Anther filaments are narrow and petal-like. The egg-shaped capsule is mottled with purple.

Our plants are var. ledifolia (Greene) Engl. & Irmsch. It is locally common below permanent snow and in late melting snow depressions throughout the Bitterroot Mountains from Lolo Peak to Mount Jerusalem. It is frequently associated with Eriogonum pyrolaefolium and Epilobium alpinum, sometimes also with Lutkea pectinata and Chionophila tweedyi. AK to CA, east to ID and W. MT.

Alpine saxifrage forms flower buds beneath the snow and blooms soon after being uncovered.

11. Saxifraga debilis Engelm.

Pygmy Saxifrage

[S. hyperborea R. Br.]

This delicate plant forms small, loose tufts with 1-several leafy stems, 3-7 cm (1-3 in) tall, and often a few small bulbs at the base. The basal leaves have slender petioles and broadly spade-shaped blades, 6-14 mm wide, with 3-5 lobes. The stem leaves are sessile and lance-shaped. The mostly purplish, bell-shaped calyx tube is 3-4 mm long with erect lobes. The spoon-shaped petals are white, often with pinkish veins. The capsule is 4-6 mm long with widely divergent beaks.

Pygmy saxifrage is a plant of permanently moist and shaded rock crevices on cool slopes of the highest peaks in the Bitterroot Mountains. B.C. to CA, east to Alta., CO, and AZ.

12. Saxifraga caespitosa L.

Tufted Saxifrage

A densely tufted, glandular-hairy species with flowering stems up to 8 cm (3 in) tall and prostrate to ascending, densely leafy, sterile branches. The wedge-shaped leaves have mostly 3 terminal, rounded lobes and are gradually tapered to the base. The few leaves of the flowering stems are smaller and lack petioles. The 2-8 flowers are borne in a terminal, nearly flat-topped inflorescence. The bell-shaped calyx has broadly lance-shaped, slightly spreading lobes about 1/2 as long as the white petals. The stamens are up to twice as long as the sepals, and the capsule is mostly 5-7 mm long.

Tufted saxifrage occurs in moist scree or rock crevices on cool north slopes of Trapper Peak and above Chaffin Lakes in the southern Bitterroot Mountains. Our plants are var. minima Blank. Circumpolar, south to OR, AZ, and NM.

13. Saxifraga oppositifolia L.

Purple Saxifrage

Purple saxifrage is a dwarf, mat-forming species with numerous prostrate branches, up to 10 cm (4 in) long, that are erect at the tips. The fleshy, dull green to purplish, oval leaves are 2-5 mm long with a concave surface and hairs only along the margins. They are opposite on the stem and densely overlapping at right angles to each other, giving the stem a 4-angled appearance. Withered leaves remain on the stem indefinitely. Solitary flowers are borne at the tips of unbranched stems. The cup-shaped calyx has fleshy, erect to spreading lobes, 2-4 mm long, with spreading hairs on the margins. The erect petals, 7-9 mm long, are reddish-purple and remain on the flower after fading. The capsule is 6-8 mm long.

Rare and local in rock crevices on 6 peaks in the southern Bitterroot Mountains. Circumpolar, south in W. North America to OR, ID, and WY.

Together with Dryas octopetala and Eritrichium nanum, this is one of the most beautiful and noteworthy alpine plants in our area.

14. Saxifraga lyallii Engl.

Lyall's or Red-stemmed Saxifrage

This saxifrage has purplish to bright red, naked stems up to 25 cm (10 in) tall. The firm, dark green leaves have slender petioles and fan-shaped blades, 1-4 cm long, and coarsely toothed margins above the middle. Flowers are borne in an open narrow-bracted inflorescence with short, nearly erect branches. The bright red calyx has elliptical, reflexed lobes, about 2-4 mm long. The white, elliptical petals have 2, quickly fading, greenish spots and are about the same length as the sepals. The anther filaments are petal-like and broadest above the middle. The capsule is 2-5 chambered and 7-12 mm long with 2 divergent beaks.

A small population of this species, which usually occurs in areas of sedimentary, often calcareous rock, has been found on a moist, mossy ledge high on the north slope of Sugarloaf Mtn. southwest of Darby. AK to WA, east to Alta. and W. MT.

Suksdorfia Gray Suksdorfia

These are herbaceous perennials with short, bulb-bearing rootstocks and erect, leafy stems. Basal leaves are broadly spade-shaped to nearly orbicular with toothed and lobed margins. Stalked flowers are

borne in a open, glandular-hairy inflorescence. Each flower has 5 petals, sepals, and stamens. The fruit is a 2-chambered capsule prolonged into 2 hollow beaks.

1. Petals white and spreading, 3-4 mm long.....(1) S. ranunculifolia
1. Petals sometimes violet, held erect and 6-9 mm long.....(2) S. violacea

1. Suksdorfia ranunculifolia (Hook.) Engl.

Buttercup-leaved Suksdorfia

This species has mostly simple stems, 10-25 cm (4-10 in) tall, and light green foliage. The several basal leaves have petioles, 3-10 cm (1-4 in) long, and nearly orbicular blades, deeply incised into 3 shallowly lobed divisions. Stem leaves are smaller with short petioles that are broadened at the base. The nearly flat-topped inflorescence has short branches bearing several flowers. The bell-shaped calyx has spreading, broadly lance-shaped lobes. The spreading petals are 3-4 mm long and white, sometimes purplish at the base. The capsules, including the short beaks, are about 4 mm long.

Buttercup-leaved suksdorfia is locally common in shallow, humus-rich, vernal wet soils, especially in mossy, seepage areas on south-facing slopes. It is found in the montane and lower subalpine zone, occasionally up to timberline in the Bitterroot Mountains and Rattlesnake Range. B.C. to CA, east to Alta., MT, and ID.

In late summer, plants growing in wet moss are often surrounded by many seedlings. This species appears to be a host for Orobanche uniflora, a root parasite. It is often associated with Montia linearis, M. parviflora, Mimulus guttatus, M. floribundus, Stenanthium occidentale, Saxifraga ferruginea, and Lewisia triphylla.

2. Suksdorfia violacea Gray

Violet Suksdorfia

Violet suksdorfia has slender stems 10-20 cm (4-8 in) tall. The 1-3 basal leaves have long petioles and broadly spade-shaped blades, 1-3 cm wide, with 5-7 shallow, slightly toothed lobes. The basal leaves are often withered by flowering time. The 3-5 stem leaves are wedge-shaped and sessile with broadened bases. The 2-10 flowers are borne on 2-3 erect to ascending branches of the open inflorescence. The cup- to bell-shaped calyx has narrowly lance-shaped, erect lobes. The white or light violet petals are 5-8 mm long and nearly erect.

This plant is rare on moist, mossy shelves in shady places in the montane zone of the Bitterroot Mountains. It has been found near Rock Creek Falls, Carlton Creek Falls, and along Tin Cup Creek. B.C. and WA, east to Alta., MT, and ID.

Tiarella L. Foamflower

Tiareella trifoliata L.

Foamflower

Foamflower is a perennial, rhizomatous herb with leafy stems, 10-25 cm (4-10 in) tall, that are glandular-hairy above. The basal leaves have slender, often glandular-hairy petioles and spade-shaped blades, 4-8 cm (2-3 in) wide, that have either 3-5 shallow, coarsely toothed lobes or are deeply divided into 3 lobed and toothed leaflets. The 2-4 stem leaves are smaller with short petioles. Small, stalked flowers are borne on short side branches in a narrow, open inflorescence 10-15 cm (4-6 in) long. The bell-shaped calyx has 5, unequal, egg-shaped lobes. The linear or awl-shaped, white petals are twice as long as the sepals and similar to the 10 anther filaments. The few-seeded capsule has 2 chambers, one much smaller than the other.

Var. unifoliata (Hook.) Kurtz has lobed leaves, not divided into distinct leaflets. It is common in moist forest from the montane to the subalpine zones. Var. trifoliata has leaf blades divided into 3 leaflets. This variety was collected on the north slope of Carlton Ridge southwest of Lolo amidst a large colony of the common var. unifoliata. AK to CA, east to Alta., MT, and ID.

SCROPHULARIACEAE Figwort Family

Plants in this family are herbaceous annuals, biennials, or perennials with alternate or opposite, simple or variously divided leaves. The bisexual flowers have a calyx of 4-5 distinct or united sepals and a corolla (sometimes lacking) of 4-5 petals that are united, at least below. The corolla may be radially symmetrical, but, more often, it has a more-or-less distinct upper and lower lip. The number of stamens is most often 4, but may be 2 or 5. The ovary occurs above the point of union of the petals and sepals. The fruit is a capsule with several to many seeds.

The Figwort Family contains many familiar, showy plants including penstemons, monkey-flowers, paintbrushes, and louseworts.

1. Leaves, at least the lower ones, paired and opposite each other on the stem.....2
1. Leaves either all basal or alternate on the stem.....8
2. Anther-bearing stamens 2.....3
2. Anther-bearing stamens 4.....4



z. *Saxifraga tolmiei* a. *S. debilis* b. *S. caespitosa* c. *S. oppositifolia* d. *S. lyallii*
e. *Suksdorfia ranunculifolia* f. *S. violacea* g. *Tiarella trifoliata* var. *trifoliata* gg. var. *unifoliata*

3. Corolla tubular and 2-lipped at the mouth.....Gratiola
3. Corolla saucer-shaped and 4-lobed.....Veronica
4. Upper 2 petals united to form a hood-shaped lip (galea) that encloses the stamens.....Melampyrum
4. Upper lip of corolla not hood-shaped.....5
5. Flowers with a sterile stamen (without anthers) as long as the fertile ones and usually hairy at the tip.....Penstemon
5. Flowers lacking a sterile stamen or, if present, shorter than fertile stamens and not hairy.....6
6. Sterile stamen present, ca. 1/2 as long as the fertile stamens; flowers all on one side of the inflorescence (secund).....Chionophila
6. Sterile stamen lacking; flowers not secund.....7
7. Flowers yellow, red, or purple.....Mimulus
7. Flowers blue and white.....Collinsia
8. Stamens 2 and longer than the corolla.....9
8. Stamens 4 or 5.....10
9. Corolla present; stem leaves reduced to a few small bracts.....Synthyris
9. Corolla absent; stem leaves present.....Besseyia
10. Anther-bearing stamens 5.....Verbascum
10. Anther-bearing stamens 4.....11
11. Corolla tubular, the upper lip prowl or hood-shaped (galea) and enclosing the anthers, sometimes elongated into a beak.....12
11. Corolla often tubular and 2-lipped but without a galea.....14
12. Leaves pinnately divided and fernlike or coarsely toothed on the margins; flower bracts green.....Pedicularis
12. Leaves entire-margined or deeply lobed but not pinnately divided or coarsely toothed; flower bracts usually colored.....13
13. Plants annual; upper and lower lips of corolla nearly the same length.....Orthocarpus
13. Plants perennial; upper corolla lip (galea) at least 2 mm longer than the lower lip.....Castilleja
14. Plants without leafy stems; leaves all basal.....Limosella
14. Plants with leafy stems.....15
15. Flowers with a spur at the base of the corolla tube; leaves entire-margined.....Linaria
15. Flowers without a spur; leaves coarsely toothed.....Scrophularia

Besseyia Rydb. Kittentails, Besseyia

These are native, fibrous-rooted perennials with alternate leaves. The flowers lack petals and are borne in a densely flowered, terminal spike. Each flower has 2 purple stamens that give the inflorescence its color.

1. Calyx (3)4 lobed, cuplike at the base and surrounding the stamens and developing fruit.....(1) B. rubra
1. Calyx 2(3) lobed, not surrounding the stamens and developing fruit.....(2) B. wyomingensis

1. Besseyia rubra (Dougl.) Rydb.

Tall Kittentails, Red Kittentails

This species has flowering stems up to 60 cm (24 in) tall. The dull green basal leaves have elliptical to nearly round blades, 4-12 cm (2-5 in) long, with toothed margins and long petioles. Stem leaves are smaller and become sessile above. Herbage is long-hairy to nearly glabrous. The 3-4 lobed calyx has a cup-shaped base that surrounds the stamens and developing fruit. The stamens are dull brownish-red. The capsules are 5-6 mm high and slightly notched on top.

Tall kittentails is common in open ponderosa pine forests in the foothills but also occurs on grassy balds and open slopes up to about 1830 m (6,000 ft), as on Sula Peak. WA to OR, east to MT.

2. Besseyia wyomingensis (Nels.) Rydb.

Prairie Kittentails, Wyoming Kittentails

Prairie kittentails is similar to B. rubra but is smaller, with stems up to 40 cm (16 in) tall. The basal leaves have a blade, 1-7 cm long, that tapers to the petiole. Herbage is grayish with a dense covering of hairs. The 2- to 3-lobed calyx does not surround the stamens and developing fruit. The stamens are lavender to dull purplish-blue.

The plant is common on grassy slopes above Missoula and on the open foothills of the Sapphire Range. It also can be found in open, rather dry subalpine habitats in these mountains but does not occur on the west side of the Bitterroot Valley or in the Bitterroot Mountains. Alta. to ID and UT, east to SD and NE.

Castilleja Mutis Paintbrush, Indian Paintbrush

Our species of paintbrush are native perennials with deeply lobed to entire leaves that are alternate on the stems. The flowers, each subtended by often colorful leaflike bracts, are borne in terminal, spikelike inflorescences that are congested in bloom but elongate as the plant matures. The calyx is composed of 4 sepals that are united below. The 5 petals are united below into a tube but separate above into a small, 3-lobed, lower lip and an elongated upper lip (galea) that encloses the 4 stamens. The capsule has numerous seeds.

Members of this genus often hybridize, making identification of some specimens difficult.

Paintbrushes are partially parasitic. Their roots attach to those of neighboring plants from which they obtain supplemental water and nutrients.

1. Upper corolla lip usually $>1/2$ the length of the corolla tube; flowers usually shades of red or orange.....2
1. Upper lip $<1/2$ the length of the tube; flowers usually shades of yellow.....6
2. Calyx tube split more deeply on side adjacent to the corolla lip than the side adjacent to the galea.....(5) C. linariaefolia
2. Upper and lower divisions of calyx equal or nearly so.....3
3. Upper leaves entire-margined, not lobed.....4
3. Leaves, at least the upper ones, lobed.....5
4. Stems usually <30 cm (12 in) tall, flowers purplish to crimson; plants most common near timberline.....(3) C. rhexifolia
4. Stems usually >30 cm tall, flowers red or orange; plants most common in the valley to lower subalpine zones.....(2) C. miniata
5. Terminal lobe of leaves much broader than the lateral lobes; plant with stiff hairs, common.....(1) C. hispida
5. Terminal lobe of leaves nearly as narrow as the lateral lobes; plants with long, soft hairs, uncommon.....(4) C. covilleana
6. Calyx lobes sharply pointed.....7
6. Calyx lobes rounded.....8
7. Lower lip of corolla $<1/2$ as long as the upper lip.....(7) C. lutescens
7. Lower lip of corolla $1/2$ or more as long as the upper lip.....(6) C. pallascens
8. Bracts shorter than the flowers; timberline or above.....(8) C. pulchella
8. Bracts equaling or exceeding the flowers; montane or lower subalpine.....(9) C. cusickii

Group I. Species in this group have flowers that are usually a shade of red.

1. Castilleja hispida Benth.

Harsh Paintbrush

Harsh paintbrush has clustered, erect, mostly unbranched stems, 20-60 cm (8-24 in) tall, from a woody base. The upper leaves have 1-2 pairs of small, short lobes towards the tip. The lower ones are smaller and often entire-margined. Foliage is covered with long, often stiff hairs. The reddish flower bracts are 3-5 lobed at the tip. The calyx has 2 long lobes at the tip that are each more shallowly 2-lobed. The red corolla is 20-40 mm long with a finely hairy upper lip that is about $1/2$ its length.

Var. hispida has a softer hairiness and rounded calyx lobes. Var. acuta (Pennell) Owenby has pointed calyx lobes and a harsher pubescence. This species is common on grassy slopes and in forest openings in the valley and montane zones. B.C. to OR, east to Alta., MT, and ID.

This is the first paintbrush to bloom, flowering in April on the hills above Missoula.

2. Castilleja miniata Dougl.

Common Red Paintbrush

This paintbrush has 1-few erect and usually branched stems; 20-80 cm (8-32 in) tall, and glabrous or short-hairy foliage. The linear to lance-shaped leaves have entire margins. The green and reddish flower bracts have a pair of lateral lobes near the tip or are entire. The calyx has 2 long lobes at the tip that are each more shallowly 2-lobed. The red or scarlet corolla is 20-40 mm long with a finely hairy upper lip that is nearly half its length.

Common red paintbrush is common in meadows, moist forests, and other mesic habitats from the valleys to the subalpine zones. AK to CA, east to Alta. and NM.

At its upper elevational limit, this species may occur with C. rhexifolia. In the valleys and

foothills, it may be found with C. hispida. Intergradation with either species may occasionally take place.

3. Castilleja rhexifolia Rydb.

Rhexia-leaved Paintbrush

This paintbrush has clustered, erect and usually unbranched stems, 10-30 cm (4-12 in) tall, from a woody base. The lance-shaped leaves have entire margins. Foliage is glabrous or pubescent with long, sticky hairs. The crimson or scarlet flower bracts have 1-2 pairs of lateral lobes near the tip. The calyx has 2 long lobes that are each more shallowly 2-lobed. The crimson or scarlet corolla is 20-35 mm long with a short-hairy upper lip that is much less than 1/2 its length.

Rhexia-leaved paintbrush is common in moist meadows and open forests in the upper subalpine and timberline zones in the Bitterroot Mountains. B.C. to OR, east to Alta., and CO.

Occurs in more mesic habitats than C. covilleana, C. pallescens, and C. pulchella.

4. Castilleja covilleana Henderson

Rocky Mountain Paintbrush

Rocky Mountain paintbrush has clustered, mostly unbranched stems, 10-30 cm (4-12 in) tall, from a woody base. The leaves have 3-7 long, linear lobes and are covered with fine, long hairs. The bright scarlet to orange-red flower bracts have 5-7 long lobes. The calyx is deeply cleft on top, less so beneath. The 2 lobes are each shallowly divided into 2 pointed lobes. The red to orange corolla, 20-35 mm long, has a finely hairy upper lip that is about 1/4 its length.

Has been found on rocky, mineral soil and rockslides near timberline close to the Bitterroot-Selway Divide in the southern Bitterroot Mountains in the West Fork Bitterroot River drainage.

5. Castilleja linariaefolia Benth.

Wyoming Paintbrush

This species has mostly branched stems, 30-70 cm (12-28 in) tall, from a woody base. The lower leaves are nearly linear and usually entire, while the upper ones have a pair of narrow, lateral lobes. The foliage is usually stiff hairy below and glabrous above but sometimes glabrous or pubescent throughout. The scarlet or bright red flower bracts are narrow with a pair of lateral lobes. The calyx is deeply divided beneath, less so above. The 2 lobes are each divided into two narrow segments at the tip. The curved red corolla, 30-45 mm long, has a finely hairy upper lip that is about 1/2 its length.

Wyoming paintbrush is rare in dry grasslands or forest openings in the montane zone in the southern Bitterroot Mountains. OR to CA, east to s. MT, CO, and AZ.

Group II. The paintbrushes in this group have flowers that are varying shades of yellow or green, sometimes tinged with red or purple.

6. Castilleja pallescens (Gray) Greenm.

Palish Paintbrush

Palish paintbrush has slender, mostly unbranched stems, 10-20 cm (4-8 in) tall, that are dull purplish. The widely spaced upper leaves have 1-2 pairs of narrow, lateral lobes, while the lower ones are often linear and entire-margined. Foliage is densely covered with short hairs. The pale yellow flower bracts have 1-2 pairs of linear, lateral lobes. The calyx is about as long as the corolla and has 2 long lobes that are each shallowly 2-lobed with pointed tips. The pale yellow or greenish-white corolla, often tinged with red or purple, is about 12-25 mm long with an upper lip not much longer than the lower lip.

This paintbrush is common on dry, grassy slopes in the foothills and montane zone and is locally common in dry meadows near or above timberline. It occurs in the alpine zone on Bare and Boulder peaks in the southern Bitterroot Mountains. Western MT and ne. ID to central WY.

7. Castilleja lutescens (Greenm.) Rydb.

Yellowish Paintbrush

Yellowish paintbrush has clustered, often branched stems, 30-60 cm (12-24 in) tall, with finely hairy foliage. The linear or narrowly lance-shaped leaves are mostly entire-margined. The yellowish flower bracts, broader than the leaves, are entire or more commonly have 1-3 pairs of lateral lobes. The calyx is about as long as the corolla and has 2 long lobes that are each shallowly 2-lobed with pointed tips. The yellow corolla has an upper lip that extends 1-10 mm beyond the mouth of the calyx.

Locally common in grasslands and forest openings from the foothills to the lower subalpine zone. B.C. to OR, east to Alta., MT, and ID.

8. Castilleja pulchella Rydb.

Showy Paintbrush

Showy paintbrush has clustered, unbranched stems, mostly 5-10 cm (2-4 in) tall, and foliage covered with long, soft hairs. Lower leaves are linear and entire-margined, while the upper ones usually have a pair of small, lateral lobes. The pale yellow or purplish flower bracts are entire or with a pair of spreading lobes. The calyx is 12-25 mm long and has 2 long lobes that are each shallowly 2-lobed with rounded tips. The yellow or purplish corolla is slightly longer than the calyx and has a lower lip nearly as long as the upper.



t



u



v

C. hispida var. *acuta*

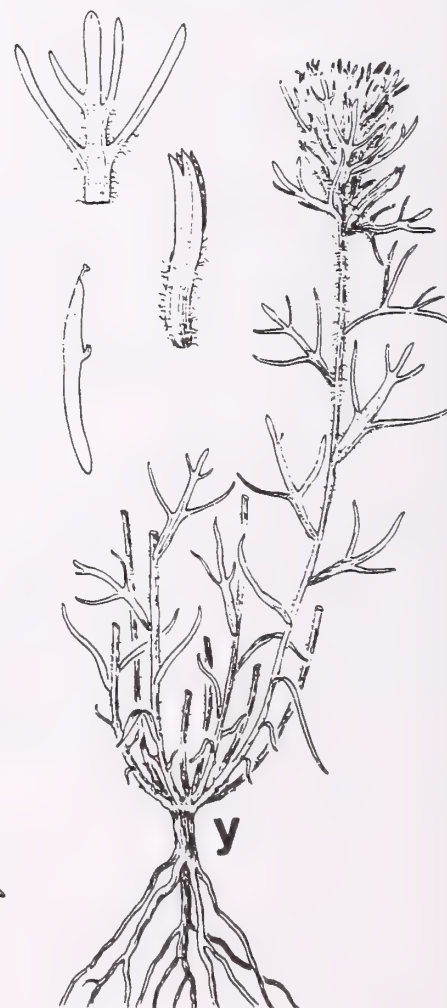
var. *hispida*



x



w



y

t. *Besseyia rubra* u. *B. wyomingensis* v. *Castilleja hispida* w. *C. miniata* x. *C. rhexifolia* y. *C. covilleana*

In our area, this species occurs in dry meadows and rocky ridge tops at or above timberline only in the northern part of the Bitterroot Mountains from Sweeney Peak to St. Mary's Peak. Southwest MT, w. WY, and ne. UT.

9. Castilleja cusickii Greenm.

Cusick's Paintbrush

This paintbrush has clustered, usually unbranched stems, 10-60 cm (4-24 in) tall, and foliage covered with short or usually long and often sticky hairs. The lower leaves are narrowly lance-shaped and entire-margined, while the upper ones have 1-3 pairs of narrow lateral lobes. The yellowish flower bracts are entire or with 1-2 pairs of lobes. The calyx, 20-30 mm long, has 2 long lobes that are rounded and entire or shallowly divided at the tip. The yellow corolla is about equal to the calyx and has a lower lip nearly as long as the glandular-hairy upper lip.

In our area, Cusick's paintbrush has been collected only in grasslands northwest of Missoula. Eastern WA and OR, east to Alta., MT, and WY.

Chionophila Benth Snowflower

Chionophila tweedyi (Canby & Rose) Hend.

Snowflower

This slender perennial has mostly single stems, 5-25 cm (2-10 in) tall, from a short rhizome or rootstock. The petiolate basal leaves are broadly lance-shaped and 2-9 cm long. The few pairs of opposite stem leaves are reduced upwards. Herbage is glabrous except for the inflorescence which is covered with stalked glands. The 4-10 stalked flowers, subtended by paired bracts, are borne at the end of the stems in a narrow, open inflorescence. The white to bluish-purple, tubular corollas are 9-14 mm long with 2 lobes above and 3 below the mouth of the tube. There are 4 anther-bearing stamens and one sterile stamen half as long as the others. The fruit is a many-seeded capsule.

Snowflower is common in late snowmelt areas throughout the Bitterroot Mountains, usually between 2440 and 2745 m (8,000-9,000 ft) on north or east-facing slopes. It often occurs in sparse vegetation beneath alpine larch associated with Luzula hitchcockii, Phyllodoce empetrifomis, and Vaccinium scoparium. Central ID and adjacent sw. MT.

The plant looks much like a penstemon but can be distinguished by the unbranched inflorescence with single flowers at the nodes. It reproduces mostly by runners and often grows in characteristic stripes. The basal leaves turn purplish in the fall.

Collinsia Nutt. Blue-eyed Mary

Collinsia parviflora Lindl.

Blue-eyed Mary

Blue-eyed Mary is a small annual with mostly branched stems up to 30 cm (12 in) but usually not more than 12 cm (5 in) tall. The entire-margined, broadly lance-shaped leaves are opposite each other on the stem. Herbage is most often sparsely hairy with glands in the inflorescence. Small flowers are borne on long, weak stalks in the axils of the upper leaves and leaflike bracts. The blue, tubular corolla is 4-7 mm long with a white, 2-lobed, upper lip and a 3-lobed lower lip. There are 4 stamens, and the fruit is an ellipsoid, many-seeded capsule.

This species is common in only vernal moist habitats such as stony slopes, rockslides, and disturbed soil near trees or along roads from the valleys to the subalpine zones. AK to CA, east to Ont., MI, and CO.

Gratiola L. Hedge-hyssop

Gratiola neglecta Torr.

Common hedge-hyssop

Common hedge-hyssop is a fibrous-rooted annual with simple or branched stems 8-30 cm (3-12 in) tall. The sessile, broadly lance-shaped leaves are entire or shallowly toothed and opposite each other on the stem. Herbage has stalked glands on the upper part of the stem. The 1-2 long-stalked flowers are borne in the axils of the upper leaves. The white or pale yellow, tubular corolla is up to 10 mm long with a purplish, 3-lobed, lower lip and a shallowly lobed upper lip. There are 2 stamens. The fruit is a pointed, hemispheric capsule.

Infrequent in muddy habitats along rivers, lakes, and ponds in the montane and, more commonly, the valley zones. It often occurs amongst sedges, rushes, and other taller shore plants. Throughout most of s. Can. and the U.S.

Limosella L. Mudwort

Limosella aquatica L.

Mudwort

Mudwort is an inconspicuous, semi-aquatic, rosette-forming, perennial with fibrous roots and lacking true stems. The narrowly elliptical leaf blades, 5-18 mm long, are more than twice as long as the petioles. Herbage is glabrous and slightly succulent. The flowers are borne singly on stalks that are



z. *Castilleja linariaefolia* a. *C. pallescens* b. *C. lutescens* c. *C. pulchella* d. *C. cusickii*
 e. *Chionophila tweedyi* f. *Collinsia parviflora* g. *Gratiola neglecta*

shorter than the leaves. The whitish, tubular corolla, 3-4 mm long, has 5 lobes that are shorter than the tube. There are 4 stamens. The fruit is a hemispheric capsule.

Locally common on open, muddy shores in the valley zone. Circumboreal and widespread in North America.

Plants become almost prostrate at maturity, and small specimens could easily be mistaken for annuals. This species also produces small plants at the ends of stolons.

Linaria Mill. Toadflax

Both species occurring in our area are rhizomatous perennials with mostly alternate leaves. Flowers are borne on short stalks at the ends of the stems. The funnel-shaped corolla is 2-lipped at the mouth and has a long, narrow, tubular projection (spur) at the base. There are 4 stamens, and the fruit is a many-seeded capsule.

The flowers resemble those of the common garden snapdragon.

- | | |
|-----------------------|-------------------------|
| 1. Leaves linear..... | (2) <u>L. vulgaris</u> |
| 1. Leaves ovate..... | (1) <u>L. dalmatica</u> |

1. Linaria dalmatica (L.) Mill.

Dalmatian Toadflax

This toadflax has erect stems up to 130 cm (4 ft) tall that are usually branched above. The sessile leaves, 2-5 cm (1-2 in) long, are egg-shaped with entire margins and pointed tips. Herbage is glabrous with a thin, waxy coating. The bright yellow corollas are 25-40 mm long with an orange-bearded lower lip and a spur nearly as long as the body.

Dalmatian toadflax is an invasive, noxious weed often forming large colonies in dry grasslands of the valleys and foothills. Native in the Mediterranean region and widely scattered throughout much of s. Can. and the U.S.

Large, dense populations can be seen along I-90 east and west of Missoula.

2. Linaria vulgaris Hill.

Butter and Eggs

Butter and eggs has stems up to 80 cm (32 in) tall, with glabrous and somewhat waxy foliage, and an unpleasant odor. The numerous, linear leaves are 2-10 cm (1-4 in) long. The light yellow flowers are 20-35 mm long with a straight spur and a lower lip that is orange on the inner surface.

This species is infrequent in disturbed soil of fields and irrigated farmland in the valleys. Introduced throughout temperate North America.

Melampyrum L. Cow-wheat

Melampyrum lineare Desr.

Cow-wheat, Quail-wheat

Cow-wheat is a slender annual with simple or branched stems up to 30 cm (12 in) tall. The linear to lance-shaped leaves, 2-5 cm (1-2 in) long, have entire margins and are opposite each other on the stem. The herbage is glandular in the upper portions. Flowers are borne on short stalks in the axils of the upper leaves and pairs of bracts. The white to pinkish, tubular corolla, 5-10 mm long, has a hood-shaped upper lip and a yellowish, 3-lobed lower lip. There are 4 stamens. The fruit is a few-seeded, egg-shaped capsule with a pointed tip.

Infrequent in mesic forests in the montane and lower subalpine zones. B.C. to WA, east to Newf. and GA.

Mimulus L. Monkey Flower

Monkey flowers are annual or perennial herbs (ours) with opposite leaves. Flowers are borne on stalks in the axils of the upper leaves. The calyx is distinctly 5-angled. The tubular corolla flares at the mouth to form 5 lobes, 2 lobes forming an upper lip and 3 lobes forming the lower. There are 4 stamens. The fruit is a capsule, usually enclosed by the calyx.

Our perennial species occur in permanently wet soil, while the annuals are found in vernal moist habitats.

- | | |
|---|-----------------------|
| 1. Flowers red or purplish..... | 2 |
| 1. Flowers yellow, often marked with red..... | 4 |
| 2. Plants perennial from rhizomes; flowers >30 mm long..... | (1) <u>M. lewisii</u> |
| 2. Plants annual; flowers <25 mm long..... | 3 |
| 3. Flowers <10 mm long..... | (2) <u>M. breweri</u> |
| 3. Flowers 10-25 mm long..... | (3) <u>M. nanus</u> |

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4. Leaves crowded near the base; flowers 1-3 at the end of the stems.....(9) M. primuloides
4. Flowers borne on stalks in the axils of the leaves.....5
5. Flowers >15 mm long; plants perennial or sometimes annual.....6
5. Flowers <15 mm long; plants annual.....8
6. Plants slimy and covered with long, white hairs.....(5) M. moschatus
6. Plants glabrous or sparsely hairy, not slimy.....7
7. Plants <20 cm (8 in) tall; flowers 1-5; sod-forming rhizomes present.....(7) M. tilingii
7. Plants often >20 cm tall; flowers usually >5; stolons but not rhizomes present.....(4) M. guttatus
8. Leaves linear or lance-shaped; corolla 4-8 mm long.....(8) M. suksdorfii
8. Leaves spade-shaped; corolla 6-14 mm long.....(6) M. floribundus

Group I. Red-flowered species.

1. Mimulus lewisii Pursh

Lewis' Monkey Flower, Red Monkey Flower

This showy species is a rhizomatous perennial with clustered stems 20-60 cm (8-24 in) tall. The sessile leaves are 3-7 cm (1-3 in) long and elliptical to lance-shaped with entire or shallowly toothed margins. The herbage is covered with long, sticky hairs. Flower stalks are 3-6 cm (1-2 in) long. The rose-pink to purplish crimson corolla has a yellow throat and is 35-50 mm long and distinctly 2-lipped.

Lewis' monkey flower is common along streams in subalpine and timberline meadows where it occurs with Mertensia ciliata, Senecio triangularis, and Saxifraga arguta. It may also occur in cool, steep-walled canyons, occasionally as low as 1220 m (4,000 ft). B.C. to CA, east to Alta., MT, WY, and UT.

2. Mimulus breweri (Greene) Rydb.

Brewer's Monkey Flower

Brewer's monkey flower is an annual with slender, simple, or few-branched stems up to 15 cm (6 in) tall. The linear to narrowly elliptical leaves are 1-2 cm long. Herbage is covered with gland-tipped hairs. Flower stalks are 3-8 mm long. The purplish-red corollas, 5-10 mm long, are indistinctly 2-lipped and slightly marked with yellow.

Infrequent and local in the Bitterroot Mountains in vernal moist open soil or moss from 1035-2375 m (3,400-7,800 ft). B.C. to CA, east to MT and nw. WY.

Colonies of this plant are difficult to see at a distance and very ephemeral.

3. Mimulus nanus H. & A.

Dwarf Monkey Flower

This annual has simple or branched stems usually less than 10 cm (4 in) tall. The entire-margined leaves are up to 35 mm long and broadly lance-shaped below becoming elliptical above. Foliage is covered with fine, glandular hairs. The nearly sessile flowers are crowded in the inflorescence. The magenta-red corollas, 10-25 mm long, are evidently 2-lipped and marked with yellow and a deeper red in the throat.

In our area, dwarf monkey flower has been found only on a dry gravelly slope above Sheephead Creek in the southern Bitterroot Mountains. WA to CA, east to MT, WY, and NV.

Group II. Yellow-flowered species.

4. Mimulus guttatus DC.

Yellow Monkey Flower

This variable plant is a fibrous rooted annual or a stoloniferous or rhizomatous perennial with stems up to 75 cm (30 in) tall. The egg-shaped to nearly round leaves are up to 10 cm (4 in) long with toothed margins. Lower leaves have petioles, while the upper are sessile. Foliage is glabrous or sparsely hairy. Flowers are borne on long stalks. The upper tooth of the calyx is noticeably larger than the others. The yellow corolla, 1-4 cm long, is distinctly 2-lipped and marked with brownish-purple within.

Var. guttatus is the larger, perennial form common in shallow water along streams from the valleys to the lower subalpine zone. The var. depauperatus (Gray) Grant is the diminutive, annual form found in vernal moist habitats, often around seeps, up to the lower subalpine zone. Most of w. North America from AK to n. Mex.

5. Mimulus moschatus Dougl.

Musk Monkey Flower

Musk monkey flower is a perennial with very slender rhizomes and weak, often prostrate, branched stems up to 25 cm (10 in) long. The sessile or short-petiolate leaves, 1-8 cm (1-3 in) long, are elliptical with shallowly toothed margins. The musk-scented herbage is covered with long, slimy, white hairs. Flowers have long stalks. The yellow corolla is 15-30 mm long and indistinctly 2-lipped.

Locally common in open or partially shaded, moist or wet soil that is not occupied by larger herbs. It occurs in the valleys but is most common in the montane zone. B.C. to CA, east to MT and CO.

6. Mimulus floribundus Lindl.

Purple-stemmed Monkey Flower

A small annual, this species has erect to nearly prostrate stems 5-25 cm (2-10 in) long. The petiolate, spade-shaped leaves are 1-3 cm long with toothed margins. Herbage is glandular and covered with slimy hairs. Flowers are borne on long stalks. The yellow corolla is 6-14 mm long and indistinctly 2-lipped with some red dots within.

Locally common in early season seepage areas from the valleys up to 2135 m (7,000 ft). It is found throughout the Bitterroot Mountains but is more common south of Lost Horse Creek. B.C. to CA, east to MT and N. Mex.

7. Mimulus tilingii Regel

Yellow Mountain Monkey Flower

This perennial monkey flower has stems up to 20 cm (8 in) tall from sod-forming rhizomes. The sessile or short-petiolate leaves are usually less than 25 mm long and elliptical in outline with entire or few-toothed margins. Herbage is glabrous. Flowers are borne on long stalks. The yellow corolla, 2-4 cm long, is distinctly 2-lipped and marked with brownish-purple within.

In our area, this species is uncommon in permanently wet, shallow soils along streams in the subalpine and timberline zones. It is known only from below Mount Jerusalem and above Chaffin Lakes in the southern Bitterroot Mountains. AK to Baja Cal., east to Alta. and NM.

This plant is similar to the more common M. guttatus but can be distinguished by the combination of well-developed rhizomes and smaller size with proportionately larger flowers.

8. Mimulus suksdorfii Gray

Suksdorf's Monkey Flower

This monkey flower is an annual with slender, branched stems 3-10 cm (1-4 in) tall. The linear or lance-shaped leaves, up to 2 cm long, are sessile or short-petiolate with entire margins. Herbage is covered with glands and short hairs. Flowers are borne on stalks less than 10 mm long. The yellow corolla is 4-8 mm long and indistinctly 2-lipped.

Suksdorf's monkey flower is rare in vernal moist, open soil in the montane zone of the Rattlesnake Mountains, and scattered plants have been found along the lower Bitterroot River. WA to CA, east to MT, WY, and CO.

9. Mimulus primuloides Benth.

Primrose Monkey Flower

Primrose monkey flower is a mat-forming perennial forming rosettes with stems usually less than 4 cm (2 in) tall from slender rhizomes. The broadly lance-shaped leaves are 7-25 mm long, mostly entire-margined, and clustered at the base. The herbage is covered with long, sticky hair or nearly glabrous. Flowers are solitary on long, erect stalks 2-10 cm long. The yellow flowers are indistinctly 2-lipped, 10-20 mm long, and often dotted with brownish-purple.

In our area, this monkey flower is known only from a subalpine Sphagnum bog near Lost Trail Pass at the southern tip of Ravalli County. WA to CA, east to SW. MT, and AZ.

Orthocarpus Nutt. Owl Clover

Members of this genus are slender, native annuals with alternate stem leaves and without a basal rosette. The sessile flowers, each subtended by a large, colorful bract, are borne in a spikelike inflorescence at the end of the stems. The tubular corolla is strongly 2-lipped with the upper 2 lobes united to form a small hood-shaped galea, and the lower 3 lobes partly united and nearly as long as the galea. There are 4 stamens. The fruit is a many-seeded capsule.

Owl clovers resemble paintbrushes (Castilleja) but can be distinguished by the annual growth form and by having a lower corolla lip that nearly equals the galea.

1. Bracts purplish or pinkish; upper lip of corolla ca. 1 mm longer than the lower.....(1) O. tenuifolius

1. Bracts greenish or yellowish; upper and lower lips of corolla about equal.....(2) O. luteus

1. Orthocarpus tenuifolius (Pursh) Benth.

Thin-leaved Owl Clover

This owl clover has stems that are 10-30 cm (4-12 in) tall and simple or branched above. Leaves are 1-5 cm long. The lower ones are linear and entire-margined, while the upper are deeply divided into linear lobes. Herbage is covered with short hairs. The pinkish-purple flower bracts are narrowly elliptical and entire or with 1-2 pairs of lobes near the base. The yellow corolla is 14-20 mm long and often purplish at the tip.

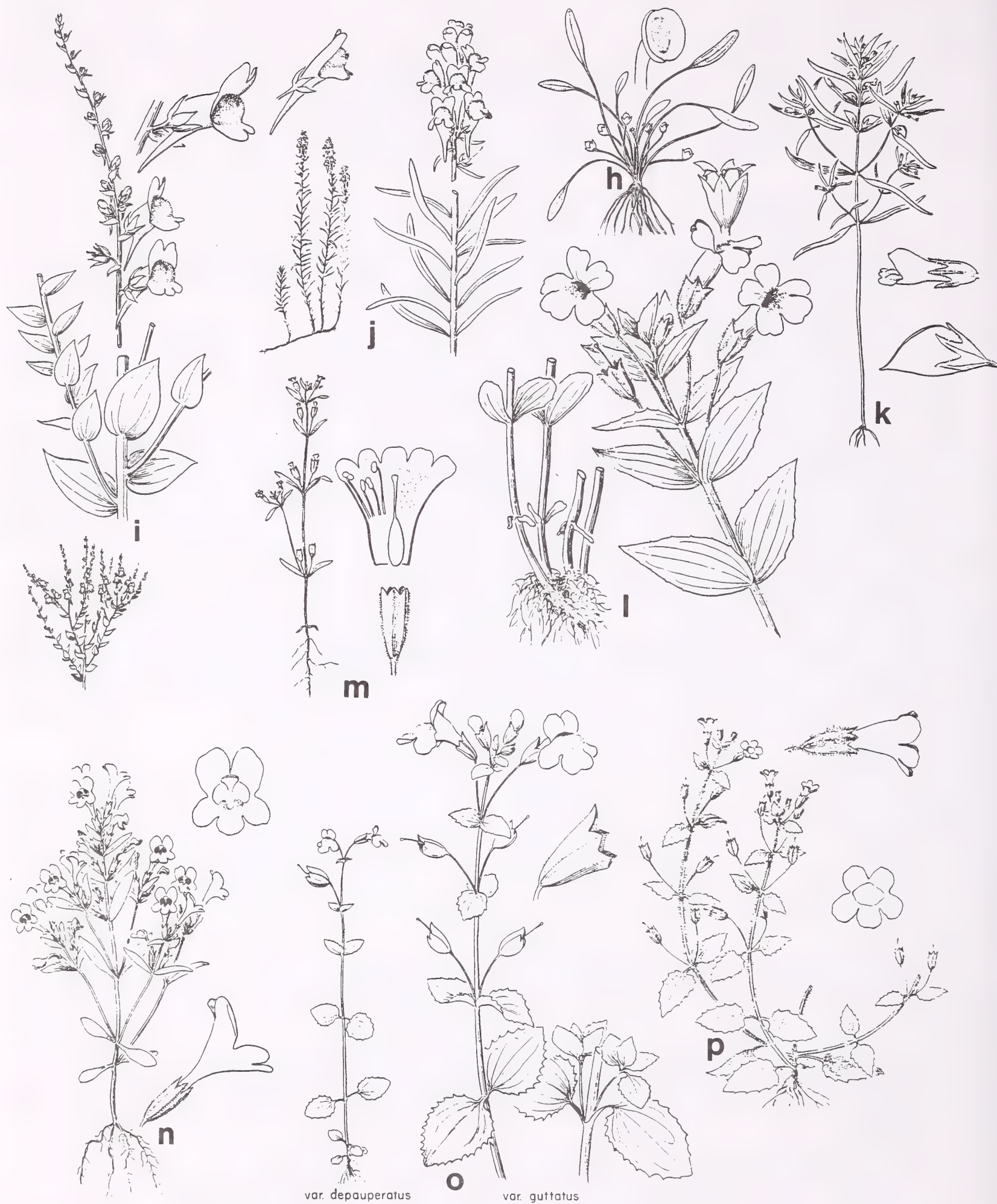
Thin-leaved owl clover is locally common in dry to moist meadows, grasslands, and forest openings in the valley and montane zones. Near Missoula it occurs on Blue Mtn. and north of Waterworks Hill. B.C. to OR, east to W. MT.

As with most annuals, populations of this species fluctuate in size from year to year.

2. Orthocarpus luteus Nutt.

Yellow Owl Clover

The plant has stems, 10-40 cm (4-16 in) tall, that are simple or branched above. The linear leaves are entire-margined and 15-40 mm long. Herbage is covered throughout with spreading hairs and may also be



h. *Limosella aquatica* i. *Linaria dalmatica* j. *L. vulgaris* k. *Melampyrum lineare* l. *Mimulus lewisii*
m. *Mimulus breweri* n. *M. nanus* o. *M. guttatus* p. *M. floribundus*

glandular in the inflorescence. The green or yellowish bracts are lance-shaped and usually have a pair of lobes at the base. The yellow corolla is 9-14 mm long. The inflorescence is congested at first but elongates as the plant matures.

This Great Plains species is uncommon in dry grasslands on the lower slopes of the Sapphire Range. B.C. to CA, east to Man. MN, NE, and NM.

Pedicularis L. Lousewort

The louseworts are perennial, partially parasitic herbs with alternate, toothed or pinnately divided leaves. The nearly sessile flowers are each subtended by a leaflike bract and borne in a spikelike inflorescence at the ends of the stems. The tubular corolla is strongly 2-lipped at the mouth with the upper 2 lobes forming a hood or beaklike galea, and the lower 3 lobes are distinct and usually shorter than the galea. There are 4 stamens. The fruit is a capsule with several to many seeds.

Although many members of this genus are attractive, they are partially parasitic on the roots of other plants, thus none of them have been cultivated for garden use.

1. Leaves merely toothed, not deeply divided.....(2) P. racemosa
1. Leaves deeply divided into numerous lobes.....2
2. Upper lip of corolla (galea) prolonged into a short straight beak.....(3) P. bracteosa
2. Galea prolonged into a long, narrow, curved beak.....3
3. Beak of galea curved downward.....(1) P. contorta
3. Beak of galea curved upward.....(4) P. groenlandica

1. Pedicularis contorta Benth.

Alpine Fernleaf

These plants have glabrous foliage and clustered stems, 15-60 cm (6-24 in) tall, from a large root crown. The petiolate basal leaves are 5-18 cm (2-7 in) long and pinnately divided into numerous, narrow, toothed lobes. Stem leaves are similar but reduced upwards. The flower bracts are deeply 3- to 5-lobed. The white, yellowish, pink, or purplish corolla is about 1 cm long and has a long, curved, snoutlike galea and a broad, shallowly lobed lower lip.

Var. contorta has white flowers and occurs in foothills grasslands, open subalpine woodlands, and rocky slopes above timberline in the northern part of our area. Var. rubicunda Reese has pinkish-purple flowers and is found in the Bitterroot Mountains south of Lost Horse Creek. B.C. to CA, east to Alta., MT, and WY.

2. Pedicularis racemosa Dougl.

Parrot's Beak

Parrot's beak has glabrous foliage and clustered stems, 15-50 cm (6-20 in) tall, from a fibrous-rooted crown. Basal leaves are reduced or lacking. The lance-shaped stem leaves have short petioles and are 4-10 cm (1-4 in) long with toothed margins. The flower bracts are similar to the leaves and are reduced upwards. The white or yellowish corolla is 10-15 mm long with a curved, beaklike galea and a prominent, shallowly lobed, lower lip.

Our plants are var. alba (Pennell) Cronq. They are common in mesic, open coniferous forests in the montane and subalpine zones. B.C. to CA, east to Alta. and NM.

This is our only Pedicularis that does not have lobed leaves.

3. Pedicularis bracteosa Benth.

Bracted Lousewort, Indian Warrior

This plant has thickened, fibrous roots, glabrous foliage below the inflorescence, and stems up to 100 cm (40 in) tall. Basal leaves are usually reduced or lacking. The short-petiolate or sessile stem leaves are 1-7 cm (1-3 in) long and pinnately divided into numerous, deeply toothed lobes. Flower bracts are lance-shaped and glabrous or hairy. The yellow to purple corolla is 13-21 mm long. The hood-shaped galea has only a short beak, and the lower lip is 3-lobed and much smaller than the galea.

Var. bracteosa has very narrow calyx segments that are usually glandular. It is common in wet meadows and moist forests in the montane and lower subalpine zone. Var. canbyi (Gray) Cronq. has broader calyx segments covered with long hairs. It is common in moist meadows from the subalpine zones to above timberline. Var. siifolia has a glabrous calyx and has been found in the extreme southern part of our area where it occurs with intermediates between the other varieties. B.C. to CA, east to Alta. and CO.

4. Pedicularis groenlandica Retz.

Elephant Head, Little Red Elephants

Elephant head has hairy foliage, coarse fibrous roots, and usually clustered stems that are 15-70 cm (6-28 in) tall. The petiolate basal leaves are 5-25 cm (2-10 in) long and pinnately divided into numerous, toothed, lance-shaped lobes. Stem leaves are similar but reduced upward. The flower bracts are small and usually divided into narrow lobes. The purplish-red corollas are 10-15 mm long with the galea prolonged into a long upturned beak and a prominent, 3-lobed, lower lip.

Locally common in wet meadows, marshes, and fens from the lower subalpine to timberline. Boreal North America, south to CA and NM.



Penstemon Mitch. Beardtongue, Penstemon

Beardtongues are perennial herbs or subshrubs with opposite, entire or toothed leaves. The 2-several stalked flowers or stalked flower clusters are borne in the axils of the upper leaves or leaflike bracts. The tubular corolla is strongly to indistinctly 2-lipped at the mouth with a 2-lobed upper lip and a lower lip with 3 lobes. There are 4 anther-bearing (fertile) stamens and a single sterile stamen that is often hairy at the tip. The fruit is a many-seeded capsule.

Several species of penstemon are cultivated, and most are easily raised from seed.

1. Anthers densely covered with long hairs; flowers >26 mm long.....2
1. Anthers glabrous or sparsely hairy; flowers often <26 mm long.....4
2. Cluster of basal leaves lacking; leaves coarsely toothed.....(15) P. montanus
2. Plants with leaves clustered toward the base; leaves entire or finely toothed.....3
3. Plants forming mats with scattered stems up to 15 cm (6 in) tall.....(13) P. ellipticus
3. Plants small, erect shrubs up to 40 cm (16 in) tall.....(14) P. fruticosus
4. Flowers yellow to nearly white.....5
4. Flowers blue, purple, or lavender.....6
5. Plants of the valleys or foothills.....(6) P. confertus
5. Plants from subalpine and timberline zones.....(11) P. flavescens
6. Plants glandular, at least in the inflorescence.....7
6. Plants not glandular.....11
7. Ovary and seed capsule glandular on top.....(4) P. eriantherus
7. Ovary and capsule glabrous.....8
8. Leaves entire-margined.....(8) P. attenuatus
8. At least some of the leaves definitely toothed.....9
9. Leaves mostly <20 mm wide, margins more finely toothed.....(1) P. albertinus
9. At least some of the leaves >20 mm wide, margins coarsely toothed.....10
10. Plants with a cluster of basal leaves larger than the stem leaves.....(2) P. wilcoxii
10. Plants without a cluster of basal leaves, lowest leaves reduced.....(10) P. diphyllus
11. Flowers 18-38 mm long.....12
11. Flowers 6-16 mm long.....14
12. Corolla 25-35 mm long; rare in sagebrush grassland.....(7) P. lemhiensis
12. Corolla 13-28 mm long, if >18 mm long, then plants not of sagebrush grassland.....13
13. Corolla <18 mm long; plants of the valleys.....(5) P. nitidus
13. Corolla >18 mm long; plants of the subalpine zones.....(12) P. payettensis
14. Flowers 6-11 mm long.....(3) P. procerus
14. Flowers 11-20 mm long.....(9) P. rydbergii

Group I. The species in this group are herbaceous and occur in dry meadows or forest openings mainly in the valley and montane zones.

1. Penstemon albertinus Greene

Albert's Penstemon

These plants often form small tufts with stems, 10-40 cm (4-16 in) tall, from a near-horizontal root crown. The dark green and leathery, petiolate basal leaves are lance-shaped, entire, or shallowly toothed, and up to 17 cm (7 in) long. Stem leaves are smaller and sessile. Foliage is glabrous, while the inflorescence is glandular-hairy. The dark blue corolla is 12-22 mm long and glandular-hairy inside the tube. The anthers are glabrous.

Albert's penstemon is common in dry, open forests or forest margins as well as disturbed soils in the valley and montane zones. It can occasionally be found up to timberline. B.C. to Alta., south to MT and S. ID.

2. Penstemon wilcoxii Rydb.

Wilcox's Penstemon

Wilcox's penstemon has clustered stems up to 100 cm (40 in) tall from a woody, branched root crown. The petiolate, basal leaves have a strongly toothed, elliptical or spade-shaped blades up to 9 cm (4 in) long. Stem leaves are mostly sessile and are often as large as the basal ones. Foliage is glabrous except for the glandular-hairy inflorescence. Flowers are borne in an open inflorescence. The blue to

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purple corollas are whitish within and are 15-23 mm long and glandular-hairy. The lower lip is longer than the upper. The anthers are glabrous.

This species is common in dry, open forests or forest margins as well as disturbed soils in the valley and montane zones. Eastern WA and OR, nw. MT, and n. ID.

P. wilcoxii and P. albertinus are similar and often hybridize in our area. P. wilcoxii can be distinguished by its larger size and more deeply toothed leaves.

3. Penstemon procerus Dougl.

Little Penstemon

These plants often form loose tufts with stems that are 5-40 cm (2-16 in) tall from a branching, nearly horizontal root crown. The petiolate basal leaves are broadly lance-shaped or elliptical, entire-margined, and up to 10 cm (4 in) long. The few stem leaves are narrower, sessile, and reduced upwards. Foliage is glabrous. Flowers occur in dense clusters in the leaf axils. The deep blue or purple corollas are 6-11 mm long with a narrow tube that is indistinctly 2-lipped at the mouth. The anthers are glabrous.

Little penstemon is most common in dry grasslands with sagebrush and bitterbrush in the foothills of the Sapphire Range, but it can also be found in dry forests up to timberline in the Bitterroot Mountains. It was once collected above timberline on Boulder Peak southwest of Darby. AK to CA, east to Sask. and CO.

4. Penstemon eriantherus Pursh

Fuzzytongue Beardtongue

This showy, herbaceous species has 1-several stems, 10-40 cm (4-16 in) tall, from a branched root crown. Basal leaves are poorly developed. The petiolate stem leaves are leathery, narrowly lanceolate, up to 13 cm (5 in) long, and entire or toothed. Herbage is usually hairy, and the inflorescence is mostly glandular-hairy. The lavender corolla is 2-4 cm long, hairy inside, and narrow at the base but wide at the mouth. The anthers are glabrous. The top of the ovary is covered with glands.

Var. eriantherus has pollen sacs that are 0.9-1.4 times as long as wide, while in var. redactus Pennell & Keck, they are 1.4-2.0 times as long as wide. This species is locally common on dry, open slopes in the valleys and foothills such as Waterworks Hill north of Missoula. B.C. to OR, east to ND, NE, and CO.

5. Penstemon nitidus Dougl.

Shining Penstemon

Shining penstemon has several stems, usually 10-30 cm (4-12 in) tall, from a branched root crown. The thick and entire-margined basal leaves are petiolate, broadly lance-shaped, and up to 10 cm (4 in) long. Stem leaves are broader and sessile. Herbage is glabrous and covered with a thin, waxy coating. The bright blue corolla is 13-18 mm long. Anthers are glabrous.

Small populations of this species occur in grasslands in the foothills of the Sapphire Range. Our plants are var. polyphyllus (Pennell) Cronq. Alta. and Man., south to ND, WY, and ID.

This plant flowers in May, earlier than all other penstemons.

6. Penstemon confertus Dougl.

Yellow Penstemon

Yellow penstemon usually forms loose tufts with stems, 20-50 cm (8-20 in) tall, from a rhizomelike root crown. The lower leaves are lance-shaped, petiolate, and up to 15 cm (6 in) long. Stem leaves lack petioles and may be larger than those at the base. Herbage is glabrous. Flowers are in dense clusters in the leaf axils. The light yellow corollas are 8-12 mm long with a narrow tube that is indistinctly 2-lipped at the mouth. The anthers are glabrous.

Rare in our area, known only from meadows southwest of Missoula near Lolo Hot Springs. B.C. to OR, east to Alta. and w. MT.

7. Penstemon lemhiensis (Keck) Keck & Cronq.

Lemhi Beardtongue

Lemhi beardtongue has 1-several stems 30-70 cm (12-28 in) tall from a branched root crown. The thick, entire-margined basal leaves have petioles and are lance-shaped and up to 16 cm (6 in) long. Stem leaves are mostly sessile and narrower. The foliage is covered with fine, short hairs. Flowers are all on one side of the inflorescence. The bright blue corolla is 25-35 mm long and about 10 mm wide at the mouth. The anthers are short-hairy.

Found in sagebrush grassland near Connor over 30 years ago, and was recently collected by W. Albert near the headwaters of the West Fork of the Bitterroot River. Lemhi County, ID; Beaverhead and Ravalli counties, MT.

Group II. The members of this group are herbaceous plants that occur from the foothills to the subalpine zone in meadows that are wet in the spring and remain moist throughout the growing season.

8. Penstemon attenuatus Dougl.

Taper-leaved Penstemon

This variable species forms loose tufts with stems up to 70 cm (28 in) tall from a rhizomelike root crown. The petiolate basal leaves are lance-shaped and up to 17 cm (7 in) long. Stem leaves are sessile and slightly broader. The foliage is mostly glabrous below the glandular-hairy inflorescence. Flowers are



z. *Pedicularis groenlandica* a. *Penstemon albertinus* b. *P. wilcoxii* c. *P. procerus* d. *P. eriantherus*
 e. *Penstemon nitidus* f. *P. confertus*

densely clustered in the leaf axils. The deep blue or purplish corollas are 12-20 mm long. The anthers are glabrous or with a line of hairs along the opening.

Var. attenuatus with glabrous anthers and narrowly lance-shaped calyx lobes has been collected near Lolo Pass. Var. militaris (Greene) Cronq. has lines of hairs along the anther openings. It has been collected in the subalpine zone in the extreme southern Bitterroot Mountains. Var. pseudoprocerus (Rydb.) Cronq. has glabrous anthers and broader calyx lobes than var. attenuatus. It is only 10-20 cm tall and occurs in dry meadows and slopes from the subalpine to above timberline in the Bitterroot Mountains, most commonly in the south. WA and OR, east to MT and WY.

9. Penstemon rydbergii A. Nels.

Rydberg's Penstemon

These plants often form loose tufts with stems, 20-50 cm (8-20 in) tall, from a rhizomelike root crown. The petiolate basal leaves are up to 15 cm (6 in) long and broadly lance-shaped with entire margins. Stem leaves are widely separated and mostly sessile. The herbage is glabrous or sometimes finely hairy in the inflorescence. The purplish-blue corollas are 11-15 mm long and moderately 2-lipped. Anthers are glabrous.

Rydberg's penstemon is infrequent in the foothills of the Sapphire Range. WA to CA, east to sw. MT, WY, and NM.

Group III. This group consists of herbaceous species that occur in well-drained soils in the mountains up through the alpine zone.

1. Penstemon albertinus Greene

Albert's Penstemon

This common low-elevation plant has a dwarf high elevation ecotype with stems less than 10 cm (4 in) tall. It occurs on dry, open slopes at 2440-2745 m (8,000-9,000 ft) on Lolo Peak, St. Mary's Peak, Ward Mountain, and Mount Jerusalem. See description above.

8. Penstemon attenuatus Dougl.

Taper-leaved Penstemon

Var. pseudoprocerus (Rydb.) Cronq. occurs in dry meadows and slopes from the lower subalpine zone to above timberline in the southern Bitterroot Mountains and Anaconda Range. See discussion above.

10. Penstemon diphyllus Rydb.

Late Penstemon

Late penstemon is somewhat woody at the base with slender stems, 10-50 cm (4-20 in) tall, from a taproot. Basal leaves are lacking, and the lowest leaves are greatly reduced. The sessile stem leaves are up to 6 cm (2 in) long and lance-shaped with coarsely toothed margins. Foliage is mostly glabrous, and the branched inflorescence is glandular-hairy. The deep blue to violet corollas are 13-19 mm long, glandular-hairy, and indistinctly 2-lipped at the mouth. The anthers have lines of hair along the openings.

Common on cliffs and talus slopes from the montane zone into the subalpine. It can be found as low as the mouth of Bass Creek and Kootenai Creek canyons. Eastern WA, central ID, and w. MT.

11. Penstemon flavescens Pennell

Pale Yellow Penstemon, Bitterroot Penstemon

The Bitterroot penstemon forms loose mats with stems between 15 and 20 cm (6-8 in) from a rhizomelike root crown. The tufted basal leaves are up to 10 cm (4 in) long, petiolate, and broadly lance-shaped with entire margins. Stem leaves are sessile and reduced upward. The herbage is glabrous. The light yellow to nearly white corollas are 12-16 mm long and evidently 2-lipped. The anthers are glabrous.

Pale yellow penstemon is common in gravelly soil of open alpine larch and whitebark pine forests and in late snowmelt areas in the upper subalpine to timberline of the Bitterroot Mountains from Granite Pass south to Lost Horse Creek. Endemic to the Bitterroot Mountains of ID and MT.

12. Penstemon payettensis Nels. & Macbr.

Payette Penstemon

The 1-several stems, 20-70 cm (8-28 in) tall, arise from a branched root crown. The thick, clustered, basal leaves have petioles and are broadly lance-shaped and up to 15 cm (6 in) long. Stem leaves are broader and clasp the stem. The herbage is glabrous. The bright blue corolla is 18-28 mm long and widened at the mouth. The anthers are glabrous.

Payette penstemon has been found in subalpine parks below Saddle Mtn. near Lost Trail Pass. ID and adjacent ne. OR and sw. MT.

Group IV. The species in this group have, at least in part, woody, perennial stems. Flowers are large and showy with woolly anthers. They occur from the montane zone to above timberline.

13. Penstemon ellipticus Coult. & Fish.

Rockvine Penstemon

Rockvine penstemon forms loose mats with scattered, erect stems 5-15 cm (2-6 in) tall. The leaves of the mat are elliptical, short-petiolate, and 10-25 mm long with finely toothed or entire margins, while



g. *Penstemon lemhiensis* h. *P. attenuatus* i. *P. rydbergii* j. *P. diphyllus* k. *P. flavescens*
l. *Penstemon payettensis* m. *P. ellipticus*

SCROPHULARIACEAE

stem leaves are sessile and usually narrower. Although the leaves are glabrous, the stems are short-hairy. Flowers are borne singly on stalks from the leaf axils. The showy, lavender-blue corollas are 27-40 mm long and about 10 mm wide at the mouth. The anthers are densely covered with long hairs.

Common on cliffs and in cracks of granitic boulders from the montane zone to above timberline in the Bitterroot Mountains. B.C. and Alta., south to sw. MT and central ID.

14. Penstemon fruticosus (Pursh) Greene

Bush Penstemon

This is a small, usually highly branched shrub up to 40 cm (16 in) tall. The lower leaves and those of the sterile shoots are up to 6 cm (2 in) long and broadly lance-shaped with entire or finely toothed margins. The upper leaves are sessile and much smaller. Herbage is glabrous and shiny dark green, while the inflorescence is glandular-hairy. Flowers are borne singly on stalks in the leaf axils. The lavender-blue corollas are 30-50 mm long and about 10 mm wide at the mouth. The anthers are densely covered with long hairs.

Bush penstemon is locally common below 2285 m (7,500 ft) in the southern part of our area. One large population is along the West Fork of the Bitterroot River. B.C. to OR, east to MT and WY.

15. Penstemon montanus Greene

Mountain Penstemon

This penstemon has many slender, lax stems, 10-30 cm (4-12 in) long, that are woody only at the base and arise from a branched, rhizomelike root crown. Basal leaves are lacking. The sessile or short-petiolate stem leaves are broadly elliptical and 15-50 mm long with toothed margins. The inflorescence and often the foliage are glandular hairy. Flowers are borne singly from stalks in the leaf axils. The blue to violet corollas are 26-39 mm long with long hairs inside on the bottom. The anthers are densely covered with long hairs.

Mountain penstemon is uncommon in rock crevices and talus in the upper subalpine zone in the southern part of our area. Central ID and sw. MT, south to UT and WY.

Scrophularia L. Figwort

Scrophularia lanceolata Pursh

Lance-leaved Figwort

A herbaceous perennial with clustered, quadrangular stems, 50-150 cm (20-60 in) tall, from thickened roots. Basal leaves are absent. The petiolate stem leaves are opposite each other and have triangular blades that are 5-15 cm (2-6 in) long with sharply toothed margins. Foliage is glabrous or finely hairy with stalked glands in the inflorescence. Flowers are borne in an open, branched inflorescence. The calyx is 5-lobed. The yellowish-green and maroon corolla is 9-14 mm long and 2-lipped. The upper lip is 2-lobed, while the lower lip has the middle lobe bent backward. There are 4 functional stamens; the fifth is reduced to a small knob on the corolla. The fruit is a many-seeded capsule.

Lance-leaved figwort is uncommon in moist meadows and forest openings in the valleys. Southern Can. and most of the U.S.

Synthyris Benth. Kittentails

Kittentails are native perennial herbs with short rhizomes, petiolate basal leaves, and small, alternate, leaflike bracts on the stem. The short-stalked flowers, often subtended by a small bract, are borne in a congested, spikelike inflorescence at the ends of the stems. The 4-lobed corollas are bowl-shaped, and the upper lobe is larger than the others. There are 2 stamens that protrude well beyond the mouth of the corolla. Flower buds of the following year are evident in the fall, and the showy flowers bloom very early in the spring.

Plants from timberline areas of the Rattlesnake Mountains appear intermediate between S. pinnatifida and the closely related S. canbyi, endemic just to the north in the Mission Mountains. These plants could key to S. missurica because of the more rounded leaves.

1. Leaves nearly round in outline and shallowly lobed or toothed; subalpine.....(2) S. missurica
1. Leaves lance-shaped and deeply lobed and dissected; timberline or alpine.....(1) S. pinnatifida

1. Synthyris pinnatifida Wats.

Cutleaf Kittentails

This species has stems up to 20 cm (8 in) tall and basal leaves that are deeply and pinnately lobed. Stems are generally longer than the leaves. The blue corolla is 4-7 mm long.

Cutleaf kittentails is locally common on open ridge tops and late snowmelt depressions near or above timberline in the Bitterroot and Rattlesnake mtns. Our plants are var. canescens (Pennell) Cronq. Central ID and sw. MT, south to WY and UT and disjunct in w. WA.

In exposed sites the stems of this plant are often less than 5 cm (2 in) tall. Plants from the Rattlesnake Range appear to be intermediate between this species and S. canbyi.

2. Synthyris missurica (Raf.) Pennell

Mountain Kittentails

Mountain kittentails has stems up to 15 cm (6 in) tall and basal leaf blades, 2-8 cm (1-3 in) wide, that are nearly round in outline with coarsely toothed or shallowly lobed margins. The leaves become dark green after flowering and persist into the next growing season. The blue corolla is 4-7 mm long.

Uncommon in our area, known from moist, open or partially shaded slopes in the subalpine zone of the southern Bitterroot Mountains. Eastern WA to CA, east to sw. MT and central ID.

VERBASCUM L. Mullein

These are introduced, Eurasian biennial herbs that produce rosettes of basal leaves the first year and solitary, flowering stems with alternate leaves in the second or third year. The stalked flowers are borne in an open or congested, spikelike, terminal inflorescence. The yellow or white, saucer-shaped corollas are 5-lobed with the upper 2 lobes slightly shorter than the others. There are 5 stamens.

1. Plants densely covered with long soft hairs; inflorescence densely congested.....(1) V. thapsus
1. Plants glabrous below and glandular above; inflorescence more open.....(2) V. blattaria

1. Verbascum thapsus L.

Common Mullein

Common mullein is a coarse plant with stems up to 200 cm (6 ft) tall. The petiolate basal leaves are broadly lance-shaped, entire-margined or shallowly toothed, and up to 40 cm (16 in) long. Stem leaves are smaller, and the upper ones clasp the stem, forming low wings below the point of attachment. The whole plant is densely covered with long soft hairs. Flowers are borne in a densely congested inflorescence, 1-2 cm wide. The yellow corollas are 10-20 mm wide. The upper 3 stamens are densely hairy. The fruit is a many-seeded, egg-shaped capsule.

This invasive weed is common along roads and in disturbed soil of dry grasslands in the valley and montane zones. Established throughout most of temperate North America.

2. Verbascum blattaria L.

Moth Mullein

Smaller than common mullein, this species has stems usually no more than 100 cm (3 ft) tall. The dark green basal leaves are broadly lance-shaped and up to 15 cm (6 in) long with toothed or lobed margins and short petioles. Stem leaves become smaller and sessile upward. The herbage is glabrous below, becoming covered with stalked glands above. Flowers are borne on stalks about 10 mm long in an open inflorescence. The light yellow corollas are 2-3 cm (1 in) wide, and the stamens are covered with purple hairs.

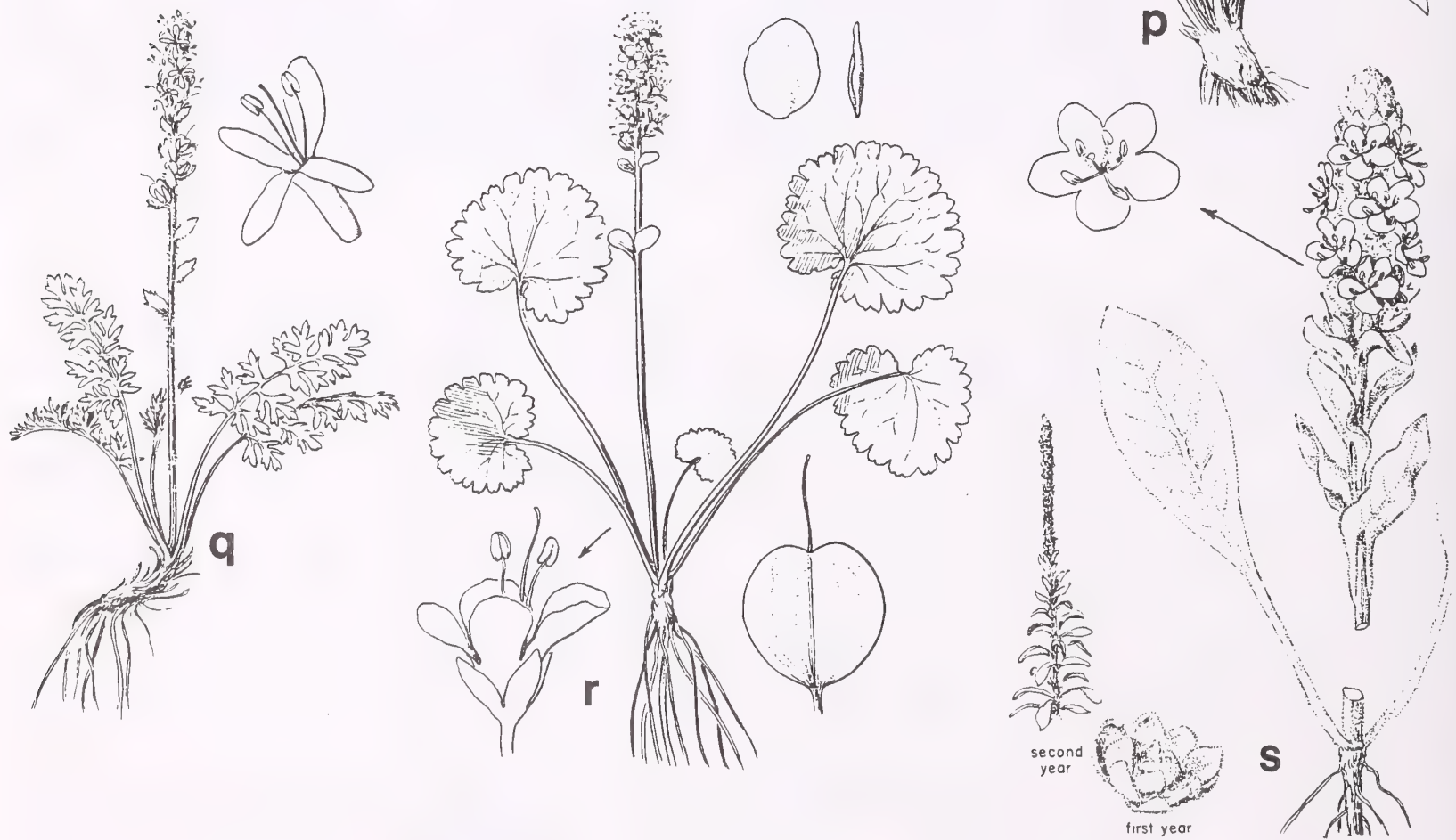
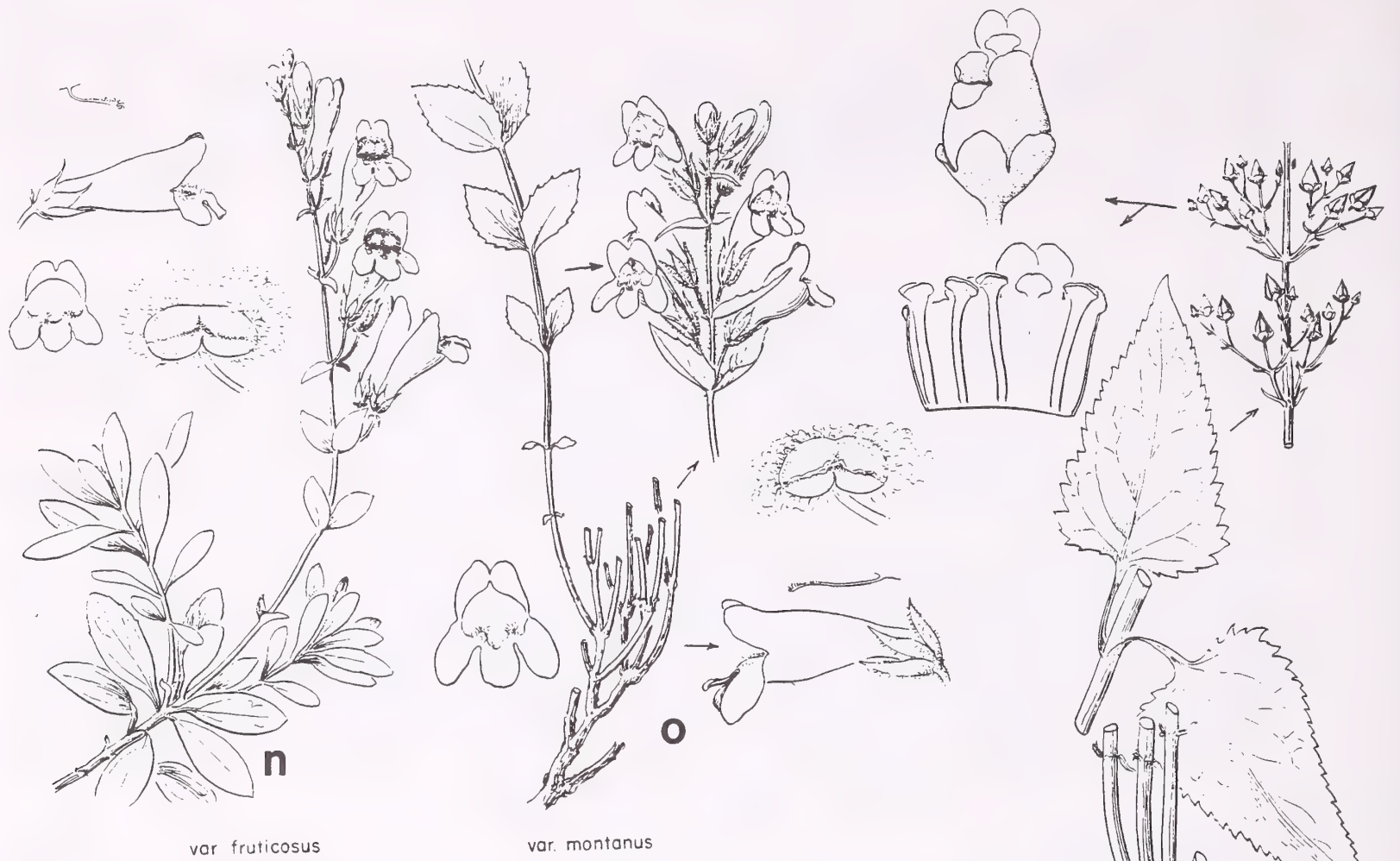
Moth mullein is infrequent in disturbed soil of overgrazed grasslands and meadows. It can be found on the open hills surrounding Missoula. Widely established in temperate North America.

Veronica L. Speedwell

Speedwells are annual or perennial herbs with only stem leaves that are opposite each other. The stalked flowers are borne on the end of the stem or on paired stalks that arise from the upper leaf axils. The saucer-shaped corollas are 4-lobed with the upper lobe the largest and the lower one the smallest. The underside of the petals is lighter in color, often nearly white. There are 2 stamens. The seed capsule is somewhat compressed and usually notched or 2-lobed at the top.

Mature fruit is often necessary for identification.

1. Flowers borne on branches of the inflorescence that arise from the axils of the upper leaves.....2
1. Flowers borne in a narrow inflorescence that terminates the leafy stem.....6
2. Plants evidently hairy throughout.....(8) V. chamaedrys
2. Plants glabrous or sparsely hairy.....3
3. Leaves all with short petioles.....(1) V. americana
3. At least the middle and upper leaves without petioles.....4
4. Capsule evidently wider than high with a conspicuous notch on top.....(4) V. scutellata
4. Capsule ca. as wide as high with an inconspicuous notch on top.....5
5. Flowers dark blue; leaves 1.5-3 times as long as wide, usually with toothed margins.....(2) V. anagallis-aquatica
5. Flowers white to light blue; leaves >3 times as long as wide with entire margins.....(3) V. catenata
6. Plants rhizomatous perennials; mostly in the mountains.....7
6. Plants taprooted or fibrous rooted annuals; mostly in the valleys.....9



n. *Penstemon fruticosus* o. *P. montanus* p. *Scrophularia lanceolata* q. *Synthyris pinnatifida* r. *S. missurica*
s. *Verbascum thapsus*

7. Lower portion of stems prostrate and rooting at the nodes.....(5) *V. serpyllifolia*
 7. Stems erect or somewhat curved at the base, not prostrate.....8
8. Style 6-10 mm long; stamens 4-8 mm long; both strongly protruding from mouth of the corolla.....(7) *V. cusickii*
 8. Style <4 mm long; stamens 1-4 mm long, not strongly protruding from corolla.....(6) *V. wormskjoldii*
9. Flower stalks >5 mm in fruit.....10
 9. Flower stalks short, <4 mm in fruit.....11
10. Corolla 2-4 mm wide across the top; fruit stalks 5-15 mm long.....(13) *V. biloba*
 10. Corolla 5-11 mm wide; fruit stalks >15 mm long.....(11) *V. persica*
11. Upper leaves and lower flower bracts deeply lobed or divided.....(12) *V. verna*
 11. Upper leaves and bracts entire or shallowly toothed.....12
12. Corolla deep blue; lower leaves broadly elliptic.....(10) *V. arvensis*
 12. Corolla white with blue lines; leaves lance-shaped or linear.....(9) *V. peregrina*

Group I. The members of this group are rhizomatous perennials of wet soil or shallow water at low or mid-elevations.

1. *Veronica americana* Schwein.

American Speedwell

This native species has stems up to 100 cm (40 in) long that arch upward from horizontal stems or rhizomes. The broadly elliptical leaves are 1-8 cm long and have short petioles and toothed or nearly entire margins. Foliage is glabrous. The flowers are borne on stems arising from the upper leaf axils. The blue corollas are 5-10 mm wide. The capsules are nearly round and not noticeably notched on top.

American speedwell is common along standing and flowing water from the valleys to the subalpine zones. Widespread in temperate North America.

2. *Veronica anagallis-aquatica* L.

Water Speedwell

Water speedwell is a biennial or perennial with glabrous foliage and mostly erect stems up to 100 cm (40 in) tall. The elliptical leaves lack petioles and clasp the stem. They are 2-10 cm (1-4 in) long with toothed or entire margins. Flowers are borne on stems arising from the upper leaf axils. The blue corollas are about 5 mm wide. The capsules are nearly round and not noticeably notched on top.

This species was introduced from Europe and seems to be increasing in our area. It is locally common along the lower Bitterroot and Clark Fork rivers. Widely established in much of the U.S.

3. *Veronica catenata* Pennell

Chain Speedwell

This native species is a perennial with glabrous foliage and stems up to 100 cm (40 in) long. The lance-shaped leaves lack petioles and are up to 10 cm (4 in) long with entire margins. Flowers are borne on stems arising from the upper leaf axils. The white or occasionally pink to pale blue corollas are about 5 mm wide. The capsules are nearly round without a noticeable notch on top.

Chain speedwell is infrequent along the Bitterroot River. Widespread in s. Can. and most of the U.S.; also in Europe.

This species is similar to *V. anagallis-aquatica* but can be distinguished by the narrower, entire-margined leaves and the usually white flowers.

4. *Veronica scutellata* L.

Marsh Speedwell

Marsh speedwell has glabrous or sparsely hairy foliage and stems up to 40 cm (16 in) long. The sessile, linear to lance-shaped leaves are 2-8 cm (1-3 in) long and entire-margined or with a few small teeth. Flowers are borne on stems arising from the axils of the upper leaves. The dull blue flowers are 6-10 mm wide. The capsules are wider than tall with a broad notch on top.

This species is uncommon in our area, known only from a few collections along the Bitterroot River. Circumboreal, south through much of the n. U.S.

Group II. These species are native, rhizomatous perennials found in moist, open habitats from the montane through the alpine zone.

5. *Veronica serpyllifolia* L.

Thyme-leaved Speedwell

A delicate plant, thyme-leaved speedwell has stems, up to 20 cm (8 in) long, that curve upward from the prostrate and branched base. The broadly elliptical leaves are 10-25 mm long and mostly sessile with entire or shallowly toothed margins. Foliage is covered with short hairs. The short-stalked flowers are borne in the axils of alternate, leaflike bracts at the end of the stem. The white to blue corollas are 4-8 mm wide. The glandular-hairy capsules are broader than high and obviously notched on top.

Var. humifusa (Dickson) Vahl has bright blue flowers and an inflorescence that is noticeably more hairy than the lower foliage. This native variety is common in moist meadows from the foothills to about 2285 m (7,500 ft). Var. serpyllifolia is uniformly hairy and has white to pale blue flowers. Introduced from Europe, this variety can be common and weedy in lawns and gardens and occurs in meadows along McClain Creek south of Lolo. Throughout most of North America.

6. Veronica wormskjoldii Roem. & Schult.

Alpine Speedwell

This species has unbranched stems that are erect or curved at the base and 7-30 cm (3-8 in) tall. The entire-margined leaves lack petioles and are 1-4 cm long and lance-shaped or elliptical. The foliage is covered with long, spreading hairs, and the inflorescence is often glandular. Flowers are borne in a congested inflorescence at the end of the stem. The blue to violet corollas are 6-10 mm wide, and the stamens are about as long as the petals. The glandular-hairy capsule is egg-shaped and notched on top.

Alpine speedwell is common in moist meadows from the lower subalpine zone to above timberline in the southern Bitterroot Mountains. It is gradually replaced by V. cusickii north of Lost Horse Creek. AK to Greenl., south to CA, NM, and NH.

7. Veronica cusickii Gray

Cusick's Speedwell

Cusick's speedwell has unbranched stems that are erect or curved at the base and up to 20 cm (8 in) tall. The entire-margined leaves lack petioles and are elliptical and 10-25 mm long. Herbage is thinly hairy and often glandular. Stalked flowers are borne at the end of the stem in a short congested inflorescence. The deep blue corollas are 8-13 mm wide, and the stamens protrude conspicuously from the mouth. The glandular-hairy capsule is egg-shaped and notched on top with the style protruding well beyond the notch.

Common in moist meadows from about 1830 m (6,000 ft) to timberline in the Bitterroot Mountains south to Lost Horse Creek. WA to CA, east to MT and ID.

Group III. This group contains introduced perennial species of gardens, lawns, hayfields, and pastures.

5. Veronica serpyllifolia L.

Thyme-leaved Speedwell

Var. serpyllifolia is introduced and occasionally found in disturbed habitats in our area. See discussion above.

8. Veronica chamaedrys L.

Germander Speedwell

Germander speedwell has stems, 15-20 cm (6-8 in) long, with curved bases arising from slender rhizomes. The sessile, broadly elliptical leaves are 15-30 mm long with coarsely toothed margins. The foliage is covered with spreading hairs. Flowers are borne on paired stems in the axils of the upper leaves. The bright blue corollas are about 10 mm wide. The capsules, which are rarely produced, are triangular with a broad, shallow notch at the top.

Known in our area only from a few lawns in the Missoula area. Introduced from Europe and found in much of the U.S.

Group IV. The species in this group are small annuals of vernal moist, open soil, often associated with irrigated or cultivated land.

9. Veronica peregrina L.

Purslane Speedwell

Purslane speedwell has fibrous roots and erect, simple or branched stems up to 20 cm (8 in) tall. The linear or lance-shaped leaves are 5-30 mm long and sessile with entire or toothed margins. Foliage is more-or-less hairy and glandular. The short-stalked flowers are borne singly in the axils of leaflike bracts in elongated inflorescences at the ends of the stems. The white corollas are only about 2 mm wide. The sparsely glandular hairy capsules are heart-shaped with a broad notch at the top.

This native species is common in vernal moist, open soil around ponds and in grasslands, and also in gardens and agricultural fields. Our plants are var. xalapensis (H.B.K.) St. John & Warren. Widespread in temperate North America and introduced in Europe.

10. Veronica arvensis L.

Common Speedwell

Common speedwell has erect to nearly prostrate and simple or branched stems up to 20 cm (8 in) long from a weak taproot. The broadly elliptical leaves are 5-15 mm long and broadly toothed. Lower leaves have short petioles, while the upper are sessile. Herbage is covered with long hairs below and shorter hairs above. The short-stalked flowers are borne singly in the axils of narrow bracts in elongated inflorescences at the ends of the stems. The violet-blue corollas are about 2 mm wide. The hairy capsules are heart-shaped with a broad notch at the top.



t. *Verbascum blattaria* u. *Veronica americana* v. *V. anagallis-aquatica* w. *V. catenata* x. *V. scutellata*
y. *Veronica serpyllifolia* z. *V. wormskjoldii*

SOLANACEAE

Uncommon in our area and has been found only in disturbed or cultivated ground in the valleys. Introduced from Europe and now common in much of North America.

11. Veronica persica Poir.

Persian Speedwell

Persian speedwell has lax stems, 10-40 cm (4-16 in) tall, that are curved at the base and arise from a weak taproot. The short-petiolate leaves are broadly elliptical and 10-20 mm long with broadly toothed margins. Herbage is sparsely covered with long hairs. Flowers are borne on long, arching stalks that arise singly from the axils of small, leaflike bracts in an open inflorescence at the ends of the stems. The blue corollas are 5-10 mm wide, and the sepals are prominent. The sparsely hairy capsule is broader than high and 2-lobed at the top.

This speedwell is known from a single collection from Hamilton. Native of Eurasia and widespread in North America.

12. Veronica verna L.

Vernal Speedwell

Vernal speedwell has a taproot and an erect stem that is usually branched from the base and 5-15 cm (2-6 in) tall. The lower leaves have short petioles and are broadly lance-shaped with broadly toothed margins. Upper leaves are sessile and pinnately divided into narrow lobes. The short-stalked flowers are borne singly in the axils of bracts at the ends of the stems. The lower bracts are lobed, while the upper are lance-shaped and entire-margined. The blue corolla is about 3 mm wide.

This European plant is recently introduced in our area and has been found on disturbed ground around Missoula and at Medicine Hot Springs in the southern part of our area. It is rapidly spreading in w. MT. (Not illustrated).

13. Veronica biloba L.

Two-lobed Speedwell

A sticky and densely glandular-hairy annual with a taproot and stems, 10-20 cm (4-8 in) tall, that are simple or branched from the base. The toothed or entire-margined leaves have short petioles and blades that are lance-shaped and 5-25 mm long. They are opposite below and progressively larger up the stem. The inflorescence consists of flowering stems arising from the axils of the upper, alternate leaves. Each flower is borne on a short stalk that elongates in fruit and is subtended by a leaflike bract. The corolla is blue and 2-4 mm wide. The hairy capsule is deeply 2-lobed and 3-4 mm high.

An apparently unaggressive weed, it was recently collected along the highway below Nez Perce Pass. Native of Eurasia and introduced into the w. U.S.

SOLANACEAE Nightshade or Potato Family

Members of this family are annual or perennial herbs, vines, or shrubs with mostly alternate, simple or pinnately divided leaves. The bisexual, tubular to bell-shaped flowers have 5 sepals and 5 united petals with a stamen arising from the base of each. There is a single style, and the fruit is a berry or capsule.

Many species are poisonous and the source of sedative or hypnotic drugs.

- | | | |
|----|---|-------------------|
| 1. | Corolla >2 cm long; fruit a capsule..... | 2 |
| 1. | Corolla <2 cm long; fruit a berry..... | 3 |
| 2. | Flowers >6 cm (2 in) long; fruit spiny, not completely enclosed by the calyx..... | <u>Datura</u> |
| 2. | Flowers <5 cm long; fruit not spiny, completely enclosed by the calyx..... | <u>Hyoscyamus</u> |
| 3. | Plants shrubs with arching to erect stems; not twining or climbing..... | <u>Lycium</u> |
| 3. | Plants herbs, if woody at the base, then stems twining or climbing..... | <u>Solanum</u> |

Datura L. Jimson Weed

Datura stramonium L.

Jimson Weed

Jimson weed is a coarse, odorous annual with nearly glabrous, branched, leafy stems at least 30-100 cm (1-3 ft) tall. The alternate, oblong leaves, 10-20 cm (4-8 in) long, are coarsely toothed or shallowly lobed. White to purplish, trumpet-shaped flowers are borne in the axils of the leaves. The 5-lobed calyx is 3-6 cm (1-2 in) long, and the corolla is 6-10 cm (2-4 in) long. The fruit is a spiny, globose to egg-shaped capsule, 3-5 cm (1-2 in) long, containing flat seeds.

This poisonous plant is rare in our area, occasionally appearing along roads or abandoned fields. Native to s. North America and introduced throughout much of the world.

Hyoscyamus L. Henbane

Hyoscyamus niger L.

Henbane

Henbane is a coarse, strong-scented annual or biennial with leafy stems up to 1 m (3 ft) tall and sticky, short-hairy foliage. Alternate, sessile leaves, up to 20 cm (8 in) long, are egg-shaped and

irregularly cleft into triangular lobes. Stalked flowers, each subtended by a leaflike bract, are borne on 1 side of the narrow inflorescence. The calyx, 20-25 mm long, is urn-shaped, and the funnel-shaped corolla, up to 4 cm (2 in) long, is purple-veined on a greenish background with purple toward the base within. The capsule is enclosed by the persistent brown calyx.

Several large populations of this introduced weed can be found between Missoula and Lolo on the east side of the valley. Native to Europe and established throughout much of North America.

This plant generally grows in soil that has been severely disturbed. It is poisonous, but the dried stems are sometimes collected for flower arrangements.

Lycium L. Matrimony Vine

Lycium halimifolium Mill.

Matrimony Vine

A glabrous shrub with sparsely spiny, arched or climbing branches 1-6 m (3-20 ft) long. The entire leaves have short petioles and elliptical to lance-shaped blades that are about 15 mm long on old wood and up to 7 cm (3 in) long on vigorous, young shoots. The 1-3 stalked flowers are borne in the axils of the leaves. The purplish, trumpet-shaped flowers are 9-14 mm long, and the egg-shaped, red berries are about 1 cm long.

Matrimony vine is sometimes cultivated, and escaped plants are occasionally found in abandoned gardens in the Missoula area. Native to Eurasia and introduced in much of the U.S.

Solanum L. Nightshade

Nightshades are annual or perennial herbs with alternate, entire to pinnately divided leaves, and erect or twining stems. The 1-many flowers are borne in inflorescences arising from or between the leaf axils. The calyx is 5-lobed, and the corolla has a short tube flaring into the 5 spreading lobes. Flowers resemble those of tomato or potato. The 5 stamens protrude beyond the corolla and have short stalks and large anthers, often forming a ring around the solitary style. The fruit is a many-seeded berry surrounded, at least in part, by the persistent calyx.

1. Plants with long, yellow spines.....(5) S. rostratum
1. Plants not spiny.....2
2. Leaves pinnately lobed, lobes >4.....(4) S. triflorum
2. Leaves not lobed or with 2 lobes at the base.....3
3. Plants perennial, often with twining or climbing stems; inflorescence branched; leaves often with 2 lobes at the base.....(1) S. dulcamara
3. Plants erect annuals with entire leaves and unbranched inflorescences.....4
4. Plants densely sticky-hairy; fruit yellow.....(3) S. sarrachoides
4. Plants glabrous or sparsely hairy; fruit black.....(2) S. nigrum

1. Solanum dulcamara L.

Bittersweet Nightshade

This rhizomatous perennial has climbing and twining stems up to 3 m (10 ft) long that are often woody at the base. The leaves have short petioles and spade-shaped blades, 2-7 cm (1-3 in) long, that usually have a pair of winglike lobes at the base. The 10-25 flowers are borne in a branched, open inflorescence. The bluish purple flowers have reflexed lobes up to 9 mm long and yellow anthers. The bright red berries, 8-10 mm long, are slightly poisonous.

Bittersweet nightshade is common in moist, open or partially shaded habitats along rivers and streams in the valleys. It is also a common garden weed. Native of Eurasia, introduced in much of U.S. and s. Can.

2. Solanum nigrum L.

Black Nightshade

Black nightshade is a taprooted annual with branching stems, 15-50 cm (6-20 in) tall, and glabrous to slightly hairy foliage. Leaves have petioles and egg-shaped to triangular blades, 2-7 cm (1-3 in) long, with bluntly toothed margins. The few-flowered, umbrellalike inflorescences are borne on arching stalks arising from the stem opposite or between the leaf axils. The white or slightly bluish corolla is 5-10 mm wide with slightly reflexed lobes. The black berry, 8-11 mm long, is poisonous when young.

Infrequent in open, disturbed, often moist habitats in the valleys. Native in much of Europe and N. and South America, this plant may or may not be native here.

3. Solanum sarrachoides Sendt.

Hairy Nightshade

Hairy nightshade is quite similar to S. nigrum, but the foliage is densely sticky-hairy, and the fruit is yellow.

It is locally common in moist, disturbed soil in the valleys. Native to South America and established in much of the world.



a. *Veronica cusickii* b. *V. chamaedrys* c. *V. peregrina* d. *V. arvensis* e. *V. persica* f. *Veronica biloba*
g. *Datura stramonium* h. *Hyoscyamus niger* i. *Lycium halimifolium*

4. Solanum triflorum Nutt.

Cut-leaved Nightshade

An annual with branched, spreading stems, 10-30 cm (4-12 in) long, and ill-scented, hairy foliage. The leaves have long petioles and oblong blades, 2-5 cm (1-2 in) long, that are deeply, pinnately lobed. The inflorescence is a mostly 3-flowered cluster borne on an arching stalk arising from between the leaf nodes. The white corolla is 5-9 mm wide, and the green berries are 9-14 mm wide.

Cut-leaved nightshade is a rare weed in fields and other disturbed areas in the valley. B.C. to CA, east to MN and OK and introduced farther east.

5. Solanum rostratum Dunal

Buffalo Bur

Buffalo bur is an annual with erect stems, 15-40 cm (6-14 in) tall, and foliage beset with yellow spines 3-10 mm long. The leaves, up to 15 cm (6 in) long, are deeply, pinnately divided into rounded lobes. Up to 15 short-stalked flowers are borne in a narrow inflorescence, congested at first but later expanding. The bright yellow corolla is 2-3 cm wide, and the berry is enclosed in the spiny calyx.

Rare in dry, somewhat disturbed soil in the Missoula area, this species is native to the Great Plains, sometimes introduced in our area.

ULMACEAE Elm Family

Ulmus L. ElmUlmus pumila L.

Siberian or Chinese Elm

Siberian elm is a small to medium-sized tree with deciduous, alternate, narrowly elliptical leaves that are 4-7 cm (2-3 in) long with toothed margins. The small, bisexual, greenish flowers are clustered in the axils of the leaves. Petals are lacking, and the calyx consists of 4-9 united sepals. The flat, winged, 1-seeded fruit (samara) is circular in outline and 11-14 mm wide. They ripen on the tree before the leaves mature.

A very hardy tree, well adapted to poor soils and dry windy habitats. It is densely branched and loses limbs at such a rate that it soon looks neglected if not regularly pruned. It commonly seeds into tree and shrub plantings, quickly outgrowing the more desirable species. Native of Asia and widely cultivated and escaped. (Not illustrated).

UMBELLIFERAE (APIACEAE) Parsley or Carrot Family

Members of this family are annual, biennial, or mostly perennial herbs with hollow, simple, or branched stems. Leaves are deeply divided and alternate or basal with petioles that sheath the stems. Flowers are borne in flat-topped inflorescences in which flower stalks of equal length arise from a single point like the spokes of an umbrella (umbel). Simple umbels borne on stalks (rays) joined together at the base form compound umbels. Sepals are small or lacking, and the 5 yellow, white or purplish petals arise from the top of the 2-celled ovary. There are 5 stamens and 2 styles. The fruit consists of 2 halves, each nerved on the outer face and separating at maturity.

This is a large, difficult family, and identification often depends on having mature fruit and sometimes roots. It contains some of our largest herbaceous plants, medicinal herbs, many edible plants as well as several of our most poisonous species.

- | | | |
|----|---|-------------------|
| 1. | Fruits and ovaries armed with prickles..... | 2 |
| 1. | Fruits and ovaries glabrous or hairy but lacking prickles..... | 4 |
| 2. | Plants glabrous or nearly so; leaves only once fully divided; plants of native habitats..... | <u>Sanicula</u> |
| 2. | Plants hairy with leaves resembling those of parsley or carrot; plants of disturbed areas..... | 3 |
| 3. | Compound umbels subtended by pinnately divided bracts..... | <u>Daucus</u> |
| 3. | Umbels not subtended by bracts..... | <u>Anthriscus</u> |
| 4. | Lower leaves highly dissected, appearing lacy or fernlike with ultimate segments or lobes mostly <3 mm wide and 10 mm long..... | 5 |
| 4. | Lower leaves mostly 1-2 times divided into definite leaflets >10 mm wide or >10 mm long or both..... | 10 |
| 5. | Plants with purple spots on the stems; moist disturbed areas..... | <u>Conium</u> |
| 5. | Stems not distinctly purple-spotted; usually native habitats..... | 6 |
| 6. | Fruits with wavy-margined wings on the outer face; ultimate umbels subtended by bracts on only one side..... | <u>Cymopterus</u> |
| 6. | Wings of fruit, if present, not wavy-margined; bracts subtending ultimate umbels, if present, not 1-sided..... | 7 |

UMBELLIFERAE

7. Compound umbels subtended by narrow bracts.....Carum
7. Compound umbels bractless or bracts very minute.....8
8. Fruit with more-or-less corky, winged margins and a flattened outer face, hardly convex.....Lomatium
8. Corky wings, if present, on the face as well as the margins; outer face convex, not flattened.....9
9. Petioles with winged (expanded) margins nearly to the first division of the leaf blade; base of stem and petioles purple.....Musineon
9. Petiole winged only near the base; base of stem and petioles not distinctly purple.....Ligusticum
10. Leaves only once divided into 3 large, maple leaf-shaped leaflets; plants very large.....Heracleum
10. Leaves more than once divided or leaflets not maple leaf-shaped.....11
11. Fruits spindle- or club-shaped, at least 4 times as long as wide.....Osmorhiza
11. Fruits more elliptic, <3 times as long as wide.....12
12. Plants at least 30 cm (12 in) tall; leaves mostly once divided into long, linear, entire-margined leaflets.....Perideridia
12. Plants smaller or with wider or toothed leaflets.....13
13. Compound umbels subtended by green, sometimes leaflike bracts.....14
13. Compound umbels without bracts.....17
14. Compound umbels subtended by leaflike, toothed or lobed bracts >2 mm wide; flowers yellow.....Angelica dawsonii
14. Compound umbels subtended by narrow bracts <2 mm wide; flowers white.....15
15. Lower leaves twice divided; veins of the leaves ending in the sinuses between the marginal teeth.....Cicuta
15. Lower leaves only once pinnately divided; veins not distinctly ending in the sinuses between the marginal teeth.....16
16. Some leaflets of upper leaves lobed halfway to the midrib; fruit round in outline.....Berula
16. Leaflets of upper leaves merely toothed; fruit elliptic in outline.....Sium
17. Flowering stems <8 cm (3 in) long, and the root is a nearly globose tuber.....Orogenia
17. Flowering stems mostly >10 cm (4 in) long; if shorter, then root not a globose tuber.....18
18. Flowers yellow.....19
18. Flowers white or purplish.....20
19. Basal leaves with leaflets >15 cm wide; plants of disturbed areas.....Pastinaca
19. Basal leaves with leaflets <15 cm wide; plants of native habitats.....Lomatium
20. Fruits flattened on the outer face with marginal wings wider than the wings on the face.....Angelica
20. Fruits convex on the outer face with marginal wings as wide as those of the face.....Ligusticum

Angelica L. Angelica

The genus contains tall, often aromatic, single-stemmed, taprooted perennials with leaves that are mostly twice divided into broad, toothed or lobed leaflets. Lower leaves have long petioles that sheath the stem. Upper leaves are smaller with more prominent sheathing. Flowers are usually borne in several compound umbels. Petals are mostly white, greenish-yellow, or rarely light pinkish-purple. Calyx teeth (sepals) are very small or lacking. The fruit is narrowly elliptical to nearly orbicular with winged ribs on the outer face.

1. Flowers distinctly yellow; plants almost always with a single umbel.....(2) A. dawsonii
1. Flowers white or pinkish; plants usually with >1 umbel.....2
2. Ovaries and fruits smooth; plants of moist rich soil.....(1) A. arguta
2. Ovaries and fruits rough like sandpaper; plants of rocky habitats.....(3) A. roseana

1. Angelica arguta Nutt.

Sharptooth Angelica

This angelica has glabrous flowering stems up to 2 m (6 ft) tall. Leaves are mostly twice divided into nearly sessile, lance- to egg-shaped leaflets, 4-12 cm (2-5 in) long, that are toothed and pointed at the tips. Flowers are borne in usually 2 umbels, each with 18-45 rays up to 8 cm (3 in) long. Bracts subtending both the main and secondary umbels are lacking or nearly so. Petals are white, and the glabrous, broadly elliptical fruits, 4-7 mm long, have narrow wings on the outside face and broader ones on the edges.

Sawtooth angelica is common in moist, rich soil along streams and seepy, forested areas in the montane and, less often, the lower subalpine zone. B.C. to CA, east to Alta., WY, and UT.

2. Angelica dawsonii Wats.

Dawson's Angelica

Dawson's angelica has slender stems 30-90 cm (1-3 ft) tall. The basal leaves are twice divided into lance-shaped leaflets, 3-6 cm (1-2 in) long, with regularly toothed margins. Flowers are usually borne on a single compound umbel with 10-30 rays, 2-4 cm long, subtended by large, toothed and lobed, leaflike bracts. Petals are pale yellow, and the oblong fruit, about 5 mm long, has wings on the edges that are wider than those on the face.

This species is locally common on steep, moist, forested slopes at 1830-2195 m (6,000-7,200 ft) in the Sapphire Range on either side of the Skalkaho Road. Southeast B.C. and adjacent Alta., south to n. ID and w. MT.

3. Angelica roseana Henderson

Rose Angelica

The stems of this plant are stout and 30-80 cm (12-32 in) tall with a thin, bluish, waxy coating. Leaves are 2-3 times divided into lance-shaped, nearly sessile leaflets, up to 5 cm (2 in) long, that are sharply toothed above the middle with large sheathing bases. The compound umbels have 15-35 rays up to 10 cm (4 in) long and are subtended by sheaths similar to the petiole bases. Flowers are white or purplish-tinged. The fruits have rough surfaces with marginal wings that are broader than those on the face.

Rose angelica is widely distributed but local in rockslides and boulder fields from the montane zone to above timberline in the Bitterroot Mountains. Western MT and adjacent ID south to UT and CO.

At higher elevations this plant remains small and nearly hidden by rocks except for the pinkish-tinged umbels. After flowering it elongates to become our tallest herbaceous alpine species.

Anthriscus Hoffm. Chervil

Anthriscus cerefolium (L.) Hoffm.

Chervil

Chervil is an annual or, perhaps in our area, a biennial with a glabrous stem up to 70 cm (28 in) tall. Leaves at the base of the plant are reduced. Those of the stem have petioles and blades that are finely dissected into numerous, small ultimate segments. Open umbels with 3-6 rays up to 25 mm long are borne on slender stalks up to 2 cm long. Each ray of the umbel bears 3-7 stalked, white flowers with a lance-shaped bract at the base of the stalks and a ring of hairs where they join to the ovaries. The egg-shaped fruit is 5-6 mm long and covered with prickles.

Once used as a kitchen herb, this old world plant has been collected in Greenough Park along Rattlesnake Creek in Missoula.

Berula Hoffm. Water Parsnip

Berula erecta (Huds.) Cov.

Water Parsnip

A glabrous, aquatic or semi-aquatic perennial with fibrous roots and leafy, branched stems, 20-80 (8-32 in) tall, that often produce runners at the base. Submerged leaves are often dissected into many hairlike segments. Emerged leaves are pinnately divided. The lower ones have elliptical leaflets, up to 5 cm (2 in) long, that are toothed and lobed, while the upper ones have much narrower leaflets with more pointed teeth on the margins. Flowers are borne in compound umbels with 6-15 rays, 1-2 cm long, and green, linear bracts at the base of both the primary and secondary umbels. Petals are white, and the elliptical to nearly orbicular fruit, 1-2 mm long, has low ribs on the face.

Water parsnip occurs in shallow water of ditches, sloughs, and streams in the valleys and, in our area, is known only from Greenough Park along Rattlesnake Creek in Missoula. Europe and much of North America.

Carum L. Caraway

Carum carvi L.

Caraway

Caraway is a glabrous biennial or short-lived perennial with a taproot and slender, leafy stems, branched from the base and 30-90 cm (1-3 ft) tall. Basal leaves have petioles and blades, 8-17 cm (3-7 in) long, that are pinnately divided into highly dissected and featherlike segments. Stem leaves are smaller with wider sheaths. Flowers are borne in numerous compound umbels of 7-14 rays, without bracts or nearly so. Petals are white, and the oblong to elliptical fruit, 3-4 mm long, is glabrous with obvious ribs on the faces.

This plant is locally common in deep, fertile soils of Ross' Hole and French Basin at the south end of our area. Native of Europe and sporadically established in the n. U.S.



j. *Solanum dulcamara* k. *S. nigrum* l. *S. sarrachoides* m. *S. triflorum* n. *S. rostratum* o. *Angelica arguta*
 p. *Angelica roseana*

Cicuta L. HemlockCicuta douglasii (DC.) Coult. & Rose

Water Hemlock

Water hemlock is a glabrous perennial with stout stems up to 1.5 m (5 ft) tall that have hollow, tuberous-thickened bases with horizontal cross sections inside. Leaves are 1-2 times pinnately divided into narrowly lance-shaped, sharply toothed, and evidently veined leaflets 3-10 cm (1-4 in) long. Greenish to white flowers are borne in compound umbels with rays 2-6 cm long. The fruits, 2-4 mm long, are slightly flattened with thickened ribs on the faces.

Locally common in the Bitterroot Valley around some open, wet areas such as irrigation ditches. It is rare in the montane zone but has been found around Mary's Frog Pond, southwest of Lolo at 1740 m (5,700 ft). AK to CA, east to Alta., CO, NM, and n. Mex.

All members of this genus are violently poisonous and can be recognized by having secondary veins that terminate in the notches between the teeth of leaflets rather than at the tip of the teeth. C. bulbifera L. with leaves dissected into linear segments and small bulbs in the axils of the upper leaves occurs in boggy habitats and could eventually be found in our area.

Conium L. Poison HemlockConium maculatum L.

Poison Hemlock

Poison hemlock is a stout, glabrous, biennial herb with a thick taproot and purple-spotted, branched stems up to 2 m (6 ft) tall. The lower leaves, 15-30 cm (6-12 in) long, are 3-4 times dissected into very small ultimate segments. White flowers are borne in numerous compound umbels with rays 1-4 cm long. Both main and secondary umbels are subtended by several green, lance- to egg-shaped bracts. The glabrous fruit is 2-3 mm long with distinct, wavy ribs on the outer faces.

Known from along Rattlesnake Creek in Greenough Park in Missoula. Introduced from Eurasia to much of North America.

This is the hemlock of ancient Greek tradition. It is extremely poisonous.

Cymopterus Raf. Cymopterus

All our species are native, perennial herbs with long, thick taproots and leaves that are 2-4 times pinnately divided into small ultimate segments. Yellow or white flowers are borne in terminal, compound umbels, the ultimate umbels subtended on 1 side by bracts. The fruits have winged ribs on the outer faces.

1. Leaves clustered at the top of a naked stem; foliage with a pale waxy coating.....(1) C. glaucus
1. Leaves clustered at the base of the plant; foliage without waxy coating.....2
2. Stems mostly >15 cm (6 in) tall; montane or lower subalpine.....(2) C. terebinthinus
2. Stems mostly <15 cm; near or above timberline.....(3) C. hendersonii

1. Cymopterus glaucus Nutt.

Grayish Cymopterus

The bluish-green foliage of this plant is covered with a pale, waxy coating, and the stems are 2-25 cm (2-10 in) tall from a simple or branched taproot. Leaves are clustered on top of a naked stem and have winged petioles and blades, 1-9 cm (.5-4 in) long, that are twice pinnately divided into leaflets with small, rounded or pointed lobes. Compound umbels with rays, 1-4 cm long, are borne on naked stalks arising from the clustered leaves, and the ultimate umbels are subtended by several linear bracts. The yellow petals are about 1-2 mm long, and the elliptical fruit, 5-7 mm long, has winged ribs that are smaller on the outer face than on the edges.

Locally common throughout our area on dry, sandy, or gravelly slopes, often with ponderosa pine, in the valleys to the subalpine zones. ID and w. MT.

2. Cymopterus terebinthinus (Hook.) T. & G.

Turpentine Cymopterus

Turpentine cymopterus has glabrous and slightly aromatic foliage, a taproot with a branched crown sheathed by old leaf bases, and stems 10-40 cm (4-16 in) long. The mostly basal leaves have long petioles and triangular blades, 3-15 cm (2-6 in) long, about 3 times pinnately divided into numerous small leaflets. Flowers are borne in compound umbels with unequal rays, 1-7 cm long, and ultimate umbels subtended by narrow, green bracts. Petals are yellow, and the egg-shaped fruit, 5-11 mm long, has unwrinkled, winged ribs that are smaller on the outer face than on the edges.

Known from ponderosa pine forests along the West Fork of the Bitterroot River. Our plants are var. foeniculaceus (T. & G.) Cronq. WA to CA, east to MT, WY, and CO.

The plant has repeatedly been confused with Lomatium grayii which does not occur in our area.



q. *Angelica dawsonii* r. *Anthriscus cerefolium* s. *Berula erecta* t. *Carum carvi* u. *Cicuta douglasii*
 v. *Conium maculatum* w. *Cymopterus glaucus*

3. Cymopterus hendersonii (Coul. & Rose) Cronq.

Henderson's Cymopterus

The dwarf perennial has glabrous foliage with a thin, waxy coating and stems, 3-11 cm (1-4 in) tall, from a long, stout taproot and a branched rootcrown that is densely covered with old leaf bases. The leaves have slender, winged petioles, 1-5 cm long, and bright blue-green blades, 5-25 mm long, that are twice pinnately divided into lance- to egg-shaped leaflets, 2-5 mm long, with a prominent midvein and thickened margins. Compound umbels with 4-7 rays (often only 4 fertile), 1-4 mm long, are borne on stalks that are 3-8(10) cm (1-3 in) long and subtended by a few narrow, papery bracts that fall early or are lacking. The prominent bracts at the base of the ultimate umbels are linear or lance-shaped with a sharp point and whitish margins. Flowers are bright yellow, and the fruits are slightly flattened with winged margins.

Henderson's cymopterus is infrequent in dry, rocky soil, often with Selaginella densa, above 2745 m (9,000 ft) on Trapper, Boulder, Sweeney, and St. Mary's peaks in the Bitterroot Mountains. Central ID. (Not illustrated).

Daucus L. CarrotDaucus carota L.

Wild Carrot, Queen Anne's Lace

Wild carrot is a biennial with a strong taproot and leafy, unbranched stems to 80 cm (32 in) tall. The leaves are glabrous to coarsely hairy with oblong blades about 3 times pinnately divided into small, narrow segments. Flowers are borne in compound umbels with pinnately divided bracts subtending the principle umbels and linear bracts beneath the ultimate ones. Petals are white except for those of the pink to purplish central flower in each ultimate umbel. The egg-shaped fruit is 3-4 mm long and beset with prickles on alternate ribs of each face.

This introduced species is uncommon in moist, relatively deep soils of disturbed areas in the valleys. Native to Eurasia and introduced into much of North America.

Heracleum L. Cow ParsnipHeracleum lanatum Michx.

Cow Parsnip

[H. sphondylium L., Sphondylium lanatum Greene]

A perennial with mostly hairy foliage and stout, single stems that may be more than 2 m (7 ft) tall. The lower leaves have winged petioles and blades divided into 3 lobed and toothed maple leaf-shaped leaflets, up to 35 cm (14 in) long. Stem leaves are smaller with broader winged petioles. Flowers are borne in compound umbels up to 20 cm (8 in) across arising from the upper leaf axils. Both primary and ultimate umbels are subtended by lance-shaped bracts. Petals are white, and those near the outside of the umbel are often larger and 2-lobed. The egg-shaped fruit is 7-12 mm long, and only the marginal ribs are winged.

Cow parsnip is common in deep, moist to wet soil around seeps, streams, and avalanche chutes in the valleys to the subalpine zones. AK to Newf., south to CA and GA; Siberia.

Plants on poor soil or at higher elevations are often somewhat dwarfed. Cow parsnip is sometimes grazed by bears.

Ligusticum L. Licorice-root

Members of this genus are native perennials with taproots sheathed by old leaf bases at the crown and glabrous, usually solitary stems that are often branched above. Leaves have winged petioles and blades 1-3 times pinnately dissected. Flowers are borne in compound umbels subtended by bracts that are inconspicuous or lacking. Petals are white to pinkish, and the fruits are oblong to elliptical with mostly winged ribs.

1. Leaves divided into numerous, linear ultimate segments 1-3 mm wide.....(2) L. tenuifolium
 1. Ultimate leaf segments wider.....(1) L. canbyi

1. Ligusticum canbyi Coul. & Rose

Canby's Licorice-root

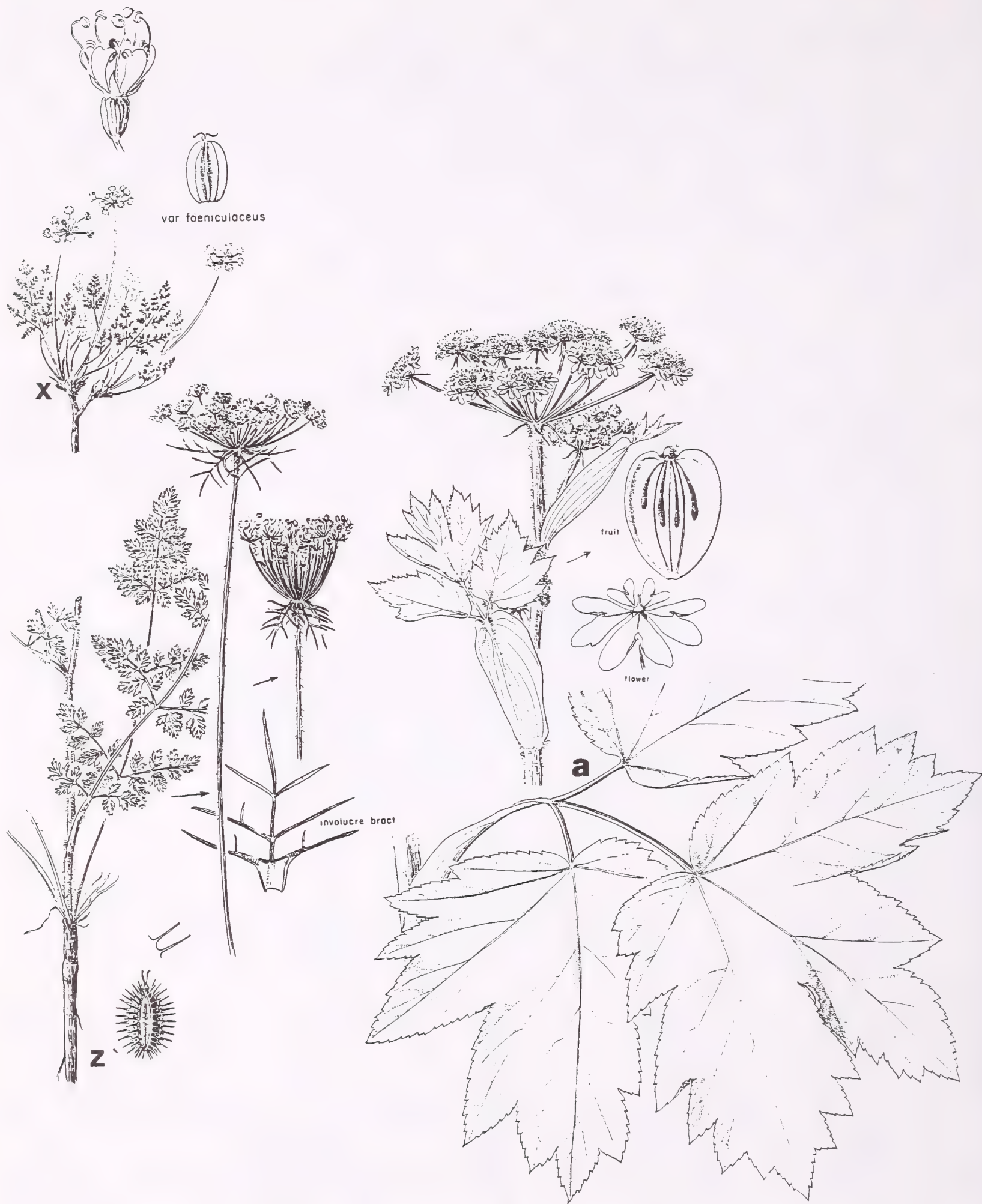
Stems of this plant are stout and 30-100 cm (1-3 ft) tall with 1-few well-developed leaves. Basal leaves are up to 20 cm (8 in) long and 2-3 times pinnately divided into lobed leaflets. Stem leaves are smaller and less finely divided. Flowers are borne in 1-few compound umbels with 15-40 rays 2-5 cm long. The oval fruits are 4-5 mm long with narrowly winged ribs.

Canby's licorice-root is common in moist meadows and open forests in the montane and lower subalpine zones. B.C. to ne. OR, east to MT and ID.

2. Ligusticum tenuifolium Wats.

Slender-leaved Licorice-root

This species has slender stems, 10-35 cm (4-14 in) tall, with or without a much-reduced leaf. Basal leaves are mostly 3 times pinnately divided into linear segments, 1-2 mm wide. The mostly solitary umbel



x. *Cymopterus terebinthinus* z. *Daucus carota* a. *Heracleum lanatum*

has 5-13 rays 1-3 cm long. Flowers may be slightly pinkish when young. The elliptical fruit is 3-5 mm long with narrowly winged ribs.

This licorice-root is common, mostly in moist meadows, from the upper subalpine zone to above timberline. Eastern OR to W. MT, south to UT and CO.

Lomatium Raf. Biscuitroot, Lomatium

These are native perennials with variously shaped taproots, petiolate, pinnately dissected leaves, and often leafless stems. Bracts subtending the compound umbels are inconspicuous or lacking, and the bracts at the base of the ultimate umbels are evident or lacking. Flowers are yellow or white, sometimes tinged with purple, and the petals often have incurved tips. The flattened fruits are narrowly elliptical to oval, with or without winged margins.

1. Many ultimate segments of the leaves >1 cm long; leaves not appearing lacy.....2
1. Ultimate segments of the leaves <1 cm. long; leaves appearing lacy.....4
2. Secondary (ultimate) umbels not subtended by bracts; taproot usually with some globose thickened segments.....(4) L. ambiguum
2. Secondary umbels subtended by small bracts; taproot usually without globose thickenings.....3
3. Bracts of secondary umbels triangular and united at the base; flowers often white or purple-tinged but sometimes yellow.....(6) L. cusickii
3. Bracts of secondary umbels linear and separate at the base; flowers yellow.....(1) L. triternatum
4. Plants usually >35 cm (14 in) tall; leaf blades 13-35 cm (5-14 in) long.....(5) L. dissectum
4. Plants mostly <35 cm tall; leaf blades <13 cm long.....5
5. Flowers white; plants mostly of the foothills.....(2) L. macrocarpum
5. Flowers yellow; plants of foothills to alpine.....6
6. Secondary (ultimate) umbels subtended by elliptic to broadly egg-shaped bracts.....(3) L. cous
6. Secondary umbels subtended by linear bracts.....7
7. Fruit at least 3 times as long as wide; taproot usually with some thickened segments; Bitterroot Mountains.....(7) L. bicolor
7. Fruit ca. 2 times as long as wide; taproot without thickened segments; Rattlesnake Mountains.....(8) L. sandbergii

1. Lomatium triternatum (Pursh) Coult. & Rose

Nine-leaf Lomatium

Nine-leaf lomatium has finely short-hairy herbage and 1-few erect stems, 10-35 cm (4-14 in) tall, from a long, narrow taproot. Basal and stem leaves have winged petioles and blades 2-3 times divided into narrow, ultimate segments up to 10 cm (4 in) long. The compound umbels are compact in bloom, but the rays expand greatly in fruit. The ultimate umbels are subtended by small, filiform bracts. Petals are yellow, and the elliptical fruits are 7-15 mm long with narrow to broad marginal wings.

Ssp. platycarpum (Torr.) Cronq. has broadly elliptical fruits with marginal wings as wide as the body. It is common in grasslands in the foothills of the Sapphire Range and infrequent in the Bitterroot Mountains up to the upper subalpine zone. Some plants from the southern part of our area appear to be intermediates between this and ssp. triternatum, which has narrowly elliptical fruits with marginal wings only half as wide as the body. B.C. to CA, east to Alta. and CO.

2. Lomatium macrocarpum (Nutt.) Coult. & Rose

Large-fruit Lomatium

Our plants have thick taproots, a branched crown, and flowering stems up to 25 cm (10 in) tall with all leaves clustered near the base. Foliage is white-hairy but sometimes purplish when young. The leaves have winged petioles and oblong to triangular blades about 3 times pinnately dissected into linear ultimate segments 1-7 mm long. The white or purplish-tinged flowers are borne in compound umbels with unequal rays, 2-6 cm long. The ultimate umbels are subtended by conspicuous, linear bracts on 1 side. The linear to narrowly elliptical fruit is 1-2 cm long with broadly winged margins.

Large-fruit lomatium is common in stony, dry soils of flats and benches in the foothills. It is perhaps the first member of the Carrot Family to bloom in our area. B.C. to CA, east to Man, ND, and UT.

3. Lomatium cous (Wats.) Coult. & Rose

Cous, Biscuitroot

Cous is 10-25 cm (4-10 in) tall with mostly glabrous foliage, a short, tuberlike taproot, and stems with or without leaves. The leaves have winged petioles and broadly lance-shaped to triangular blades 2-3 times divided into short, crowded segments. The compound umbels have unequal rays, and the ultimate umbels are subtended by prominent, green to purplish, egg-shaped bracts 2-5 mm long. Petals are yellow, and the glabrous or roughened, oblong to elliptical fruit, 5-12 mm long, has marginal wings about equal to the body.

UMBELLIFERAE

Common in rocky soil and dry, open slopes in the foothills around Missoula and up to 1735 m (5,700 ft) on Maclay Mtn. south of Lolo. Eastern OR and WA, east to ID and MT.

Roots of cous were gathered for food by Native Americans. It blooms very early on the dry slopes east of Missoula.

4. Lomatium ambiguum (Nutt.) Coult. & Rose

Wyeth's Biscuitroot, Desert Swale Biscuitroot

The simple to branched stems are 10-45 cm (4-18 in) tall with a few well-developed leaves, and the roots are nearly round to elongated with globose swellings. Leaves have broadly winged and sheathing petioles and blades about twice pinnately divided into unequal, linear segments up to 6 cm (3 in) long. Compound umbels have unequal rays, and subtending bracts are lacking. Flowers are yellow, and the narrowly oblong fruits, 5-12 mm long, have narrow wings on the margins.

Wyeth's biscuitroot is locally common on dry, gravelly, open slopes in the foothills and throughout the montane zone. B.C. to ne. OR, east to MT, WY, and UT.

This species blooms after our other foothills lomatiums. It is similar to L. triternatum and can best be distinguished by its globose-thickened roots.

5. Lomatium dissectum (Nutt.) Math. & Const.

Fern-leaved Lomatium

The largest lomatium in our area, this species has stout, glabrous stems, 40-100 cm (16-40 in) tall, and a large, woody taproot with a branched crown. Basal leaves have long petioles and broadly triangular blades 3-4 times pinnately divided into short segments about 1 mm wide. The few stem leaves are smaller with short petioles. The 10-30 rays of the compound umbel are up to 10 cm (4 in) long at maturity, and the ultimate umbels are subtended by narrow bracts. Flowers are yellow, and the oval fruit, 8-16 mm long, has narrow marginal wings and inconspicuous ribs on the faces.

Our plants are var. multifidum (Nutt.) Math. & Const. Small populations of fern-leaved lomatium are widespread near rockslides or outcrops in the valley and montane zones. B.C. to CA, east to Alta., CO, and AZ.

6. Lomatium cusickii (Wats.) Coult. & Rose

Cusick's Lomatium

Our plants are up to 15 cm (6 in) tall from a branched rootcrown and a slender taproot. The mostly basal leaves have purplish, sheathing petioles, often surrounded by old leaf bases and blades that are twice ternately and pinnately dissected into narrow segments up to 7 cm (3 in) long. Rays of the compound umbels are unequal, and the ultimate umbels are subtended by triangular bracts united at the base. Plants from above timberline have white or cream-colored flowers, often with a purplish tinge, while those from lower elevations have yellow flowers. The narrowly elliptical fruits, 7-15 mm long, have broad marginal wings.

Cusick's lomatium is locally common in meadows and on rocky slopes near or above timberline in the Bitterroot Mountains. It is infrequent in the montane and subalpine zones. Eastern OR, central ID, and sw. MT.

7. Lomatium bicolor (Wats.) Coult. & Rose

Bicolor Biscuitroot

Bicolor biscuitroot has 1-several stems, 10-30 cm (4-12 in) tall, from a slender taproot with thickened segments. The mostly basal leaves are pinnately dissected into filiform segments. The 5-15 rays of the compound umbels are unequal in length, and the ultimate umbels are subtended by narrow, pointed bracts. Flowers are yellow, and the narrowly elliptical fruit, 10-15 mm long, has narrow winged margins.

The plant locally common in rockslides or outcrops from 1525 m (5,000) to near timberline in the Bitterroot Mountains. WA to CA, east to w. MT, CO and AZ. (Not illustrated).

8. Lomatium sandbergii Coult. & Rose

Sandberg's Desert-parsley

This lomatium has a long, slightly thickened taproot, foliage that is glabrous or rough to the touch, and stems, 10-25 cm (4-10 in) tall, that are often branched near the base. The leaves have winged petioles and blades, 2-7 cm (1-3 in) long, that are 3 times pinnately divided into narrow segments 2-4 mm long. Rays of the compound umbel, 2-10 cm long at maturity, are unequal in length, and the ultimate umbels are subtended by several linear bracts. Flowers are yellow, and the elliptical fruits, 5-8 mm long, have a rough surface.

Uncommon on ridges and open slopes in the upper subalpine and timberline zones in the Rattlesnake Mountains. It is more common north of our area. Northern ID, nw. MT, and sw. Alta.

Musineon Raf. Musineon

Musineon vaginatum Rydb.

Sheathed Musineon

A perennial with a stout taproot and 1-several stems that are purple at the base and 12-25 cm (5-10 in) tall. The leaves have conspicuously winged petioles, purple at the base, and blades 2-3 times pinnately dissected into slender segments. The pale lemon-yellow flowers are borne in compound umbels 1-2 cm wide. The egg-shaped fruits, 3-4 mm long, are evidently ribbed but without wings.

UMBELLIFERAE

Sheathed musineon is locally common in stony soil of open forests in the foothills on both sides of the Bitterroot River from just south of Lolo to near the confluence with the Clark Fork. It is known only from our area and just east in the Garnet Range, the Bridger Mountains near Bozeman and the Pryor and Big Horn Mountains south of Billings in Montana and Wyoming.

The genus is similar to Lomatium and Cymopterus but can be distinguished by the completely wingless fruit.

Orogenia Wats. Turkey-peas

Orogenia linearifolia S. Wats.

Turkey-peas, Snowdrops

Our smallest member of the Carrot Family is a perennial with leafless stems, only 3-6 cm (1-2 in) tall, and tuberlike roots. The leaves have sheathing, winged petioles, and the blades are 1-3 times divided into 3's with linear, ultimate segments. The tiny compound umbel, usually about 1 cm wide, has few secondary umbels. Flowers are white, and the elliptical fruit, 3-4 mm long, has evident ribs on the outer face.

Turkey-peas is infrequent in the montane zone of the Bitterroot Mountains along Watchtower and Sheephead creeks southwest of Darby. Eastern WA and sw. MT, south to OR, UT and CO.

This ephemeral species blooms as soon as snow cover recedes, usually in early May, and has totally disappeared by July.

Osmorhiza Raf. Sweet Cicely, Sweetroot

These are native, herbaceous perennials with branched stems from stout roots. Leaf blades are mostly twice divided into 3's (ternate) with toothed or lobed, lance-shaped to nearly round leaflets. Flowers are borne in open, compound, bractless umbels from the axils of the leaves. Fruits are nearly spindle-shaped and compressed along the sides.

1. Flowers yellow and fruit glabrous; plants smelling of anise.....(2) O. occidentalis
1. Flowers white to pink or purple; fruits hairy; plants not strongly odoriferous.....2
2. Fruits hairy below but glabrous on the upper third.....(4) O. purpurea
2. Fruits hairy to near the tip.....3
3. Fruits concavely narrowed to a beaklike tip; flowers white; common.....(1) O. chilensis
3. Fruits abruptly rounded at the tip, beak lacking; flowers sometimes purplish or pink; uncommon.....(3) O. depauperata

1. Osmorhiza chilensis H. & A.

Mountain Sweetroot

Mountain sweetroot has 1-3 slender, often weak stems, 25-90 cm (10-36 in) tall, from a taproot. Basal leaves have long petioles and blades twice divided into 3's with thin, lobed, or coarsely toothed egg-shaped leaflets. Stem leaves are smaller with shorter petioles. Greenish-white flowers are borne in several open and relatively few-flowered, compound umbels. The stiffly hairy fruit, 12-20 mm long, is spindle-shaped but tapered gradually to the base and abruptly narrowed to a short beak at the tip.

Common in moist, open or shaded habitats such as thickets, forests, and disturbed areas from the river valleys to the lower subalpine zone. AK to CA, east to Newf., NH, CO, and AZ; South America.

2. Osmorhiza occidentalis (Nutt.) Torr.

Western Sweet-cicely

This species has sturdy stems, 40-130 cm (16-50 in) tall, from a stout taproot. Basal leaves have long petioles and blades twice ternately or pinnately divided into egg-shaped to narrowly elliptical, toothed and lobed leaflets 2-10 cm (1-4 in) long. Stem leaves are smaller with shorter petioles, becoming nearly sessile in the inflorescence. The whole plant has a strong odor of anise or licorice. Compound umbels have 5-12 rays that elongate at maturity. Flowers are greenish-yellow, and the glabrous fruits, 12-20 mm long, are bluntly spindle-shaped with a short beak at the tip.

Western sweet-cicely is common in tall herb communities on moist slopes and along streams and seeps and immediately below stabilized rockslides in the montane and subalpine zones. B.C. to CA, east to Alta. and CO.

3. Osmorhiza depauperata Phil.

Blunt-fruit Sweet-cicely

The plant has stems 15-60 cm (6-24 in) tall, and is vegetatively similar to O. chilensis. The flowers are greenish-white to pink or purplish, and the rays of the compound umbels spread at angles wider than in O. chilensis. The stiffly hairy fruits are club-shaped, tapered gradually to the base and abruptly rounded at the tip without a distinct beak.

Blunt-fruit sweet-cicely is uncommon in moist forests up to 1830 m (6,000 ft). AK to CA, east to Newf., VT, SD, and NM; South America.

4. Osmorhiza purpurea (Coult. & Rose) Suksd.

Purple Sweet-cicely

Purple Sweet-cicely is also similar to O. chilensis, but the flowers are usually pink or purplish. The spindle-shaped fruits, 8-13 mm long, are tapered at both ends, but only the lower portion is hairy.

Infrequent in moist forests or forest margins in the montane and lower subalpine zones. It has been collected at 1830 m (6,000 ft) along the Elk Meadows Road southwest of Lolo.

Pastinaca L. ParsnipPastinaca sativa L.

Wild Parsnip

Wild parsnip is a biennial with stout, leafy stems, 30-100 cm (1-3 ft) tall, from a large taproot. Basal leaves up to 50 cm (20 in) long are once pinnately compound into usually 9-13 lance- to egg-shaped leaflets up to 13 cm (5 in) long. Flowers are borne in bractless, compound umbels with 15-25 rays 2-10 cm (1-4 in) long. Flowers are yellow, and the broadly elliptical, glabrous fruits are about 6 mm long with fine ribs on the outer face.

This European species is the wild form of the cultivated parsnip. It has been collected in disturbed ground east of Hamilton and north of Stevensville. Introduced throughout much of North America.

Perideridia Reichenb. YampahPerideridia gairdneri (H. & A.) Math.

Yampah

A glabrous perennial with slender, solitary, leafy stems, 30-100 cm (1-3 ft) tall, from tuberlike roots. Basal leaves are mostly once divided into 3-7 linear leaflets 2-15 cm (1-6 in) long. White flowers are borne in 1-3 compound umbels with rays up to 6 cm (2 in) long and ultimate umbels subtended by small, very narrow bracts. The glabrous fruit, 2-3 mm long, is nearly round with prominent ribs on the outer face.

Yampah is common in moist meadows and open slopes in the montane and subalpine zones such as those east of Peterson Lake west of Florence. B.C. to CA, east to Sask., SD and NM.

The edible roots were used by Native Americans and are eaten by bears. The herbage, especially when young, is relished by deer, elk, and livestock. In areas where cattle are grazed, yampah can still be found only on sites that are inaccessible.

Sanicula L. Sanicle, Snakeroot

Ours are perennial herbs with erect stems and palmately or pinnately divided, alternate and basal leaves. Compound umbels subtended by leafy bracts are composed of few globose ultimate umbels, each subtended by small bracts. White or yellow flowers are bisexual or with male parts only. The globose to egg-shaped fruits are covered with hooked prickles.

1. Flowers whitish; leaves with leaflets originating from 1 point (palmate).....(1) S. marilandica
1. Flowers yellow; leaves pinnately divided (leaflets originating from different points on a main axis).....(2) S. graveolens

1. Sanicula marilandica L.

Black Snakeroot

Black snakeroot has fibrous roots and solitary, branched stems 30-80 cm (12-32 in) tall. Lower leaves have long petioles and broadly spade-shaped blades palmately divided into 5-7 sharply toothed or lobed, lance-shaped leaflets. Stem leaves are smaller and nearly sessile above. Compound umbels are subtended by a pair of 3-lobed, pointed, leafy bracts, and ultimate umbels are about 1 cm wide. Flowers are greenish-white, and the prickly, egg-shaped fruits are 4-6 mm long.

Infrequent and widely scattered in moist meadows and riparian forests in the valleys and foothills. It is locally common in the meadows along the Bitterroot River south of Lolo. B.C. to Newf., south to WA, ID, NM, and FL.

2. Sanicula graveolens Poepp.

Sierra sanicle

This species has a slender or thickened taproot and solitary stems, 10-30 cm (4-12 in) tall, that are often purplish and branched near the base. Lower leaves have long petioles, often arising from below the ground, and egg-shaped blades are pinnately divided into 3-5 toothed and lobed leaflets. Compound umbels are subtended by leafy bracts, deeply divided into pointed lobes. Flowers are yellow, and the prickly, short-stalked fruit is egg-shaped and 3-5 mm long.

Sierra sanicle was once collected in moist soil near Missoula. B.C. to CA, east to w. MT and WY; South America.



i. *Lomatium cusickii* j. *L. sandbergii* k. *Musineon vaginatum* l. *Orogenia linearifolia* m. *Osmorhiza chilensis*
 n. *Osmorhiza occidentalis* o. *O. purpurea* p. *O. depauperata* q. *Pastinaca sativa*

Sium L. Water ParsnipSium suave Walt.

Water parsnip

Water parsnip is a fibrous-rooted perennial with stout, solitary stems, 50-120 cm (20-48 in) tall, that are branched above. The basal and stem leaves are once pinnately divided into 7-13 toothed or lobed, linear to narrowly lance-shaped leaflets. Submerged leaves often have much narrower leaflets than those above the water, and roots often emerge from the lower nodes. Compound umbels and ultimate umbels are subtended by narrow bracts. Flowers are white, and the broadly elliptical to nearly round fruits, 2-3 mm long, are glabrous with slightly winged ribs on the outer faces.

This plant is common in shallow water of ditches, channels and sloughs in the Bitterroot and Clark Fork river valleys. B.C. to CA, east to Newf. and VA.

Water parsnip resembles the poisonous Cicuta douglasii, and they often occur in the same habitat, but the former can be distinguished by the indistinct leaf veins that do not end in sinus between the tips of the marginal teeth.

URTICACEAE Nettle Family

Urtica L. Stinging NettleUrtica dioica L.

Stinging Nettle

Stinging nettle is a rhizomatous perennial with erect stems up to 2 m (6 ft) tall and simple, opposite, lance-shaped leaves, 7-15 cm (3-6 in) long, that are sharply toothed and covered with stinging hairs. Numerous, small, unisexual flowers are clustered on drooping branches of a compact inflorescence at the base of the leaves. Plants may have one or both sexes of flowers. There are 4 sepals, and petals are lacking. Male flowers have 4 stamens, while females have a single rudimentary style. The fruit is a lens-shaped achene, about 1 mm long, enclosed in the calyx. Ours is ssp. gracilis (Ait.) Seland.

Var. gracilis has nearly glabrous stems and sparsely hairy leaves with broadly lance-shaped blades. The inflorescence is shorter than the leaves. This variety is common in moist, rich soil of open or partially shaded habitats in the valley and montane zones. Var. holosericea (Nutt.) Hitchc. has densely hairy leaves with narrowly lance-shaped blades. Branches of the upper inflorescences are longer than the reduced leaves. This variety was once collected southeast of Missoula. Circumboreal, south to South America.

VALERIANACEAE Valerian Family

These are annual or perennial herbs with opposite, simple or pinnately divided leaves. Bisexual or unisexual flowers are borne in terminal, congested or branched and open inflorescences. The calyx is absent, and the 5 petals are united to form a 5-lobed, tubular corolla rising from the top of the ovary. There are 1-4 stamens and a single style. The fruit is a single seed with a dry covering (achene).

1. Fruits with a tuft of featherlike hairs at the top; leaves all undivided; plants annual.... Plectritis
1. Fruits lacking tuft of hairs on top; some leaves usually pinnately divided; plants perennial..... Valeriana

Plectritis DC. PlectritisPlectritis macrocera T. & G.

White Plectritis

Plectritis is a slender, glabrous annual with erect, mostly unbranched stems up to 30 cm (12 in) tall. Lower leaves are egg-shaped and 1-4 cm long with short petioles, while those further up are sessile and nearly elliptical. Flowers are borne in an interrupted, narrow, spikelike inflorescence. The white or pinkish corolla is 2-6 mm long with 3 stamens. The winged achene is 2-4 mm long.

This plant is common in vernal moist, open or partially shaded habitats north of Missoula and in the foothills of the Bitterroot Mountains. B.C. to CA, east to MT and UT.

Valeriana L. Valerian

These perennials have aromatic roots and erect, leafy stems, often with a cluster of leaves at the base. Stem leaves are opposite and pinnately divided. Flowers are borne in a branched inflorescence with narrow bracts at the base of each branch. The tubular corollas have 3 stamens, and the achene is topped by a tuft of fine, featherlike hairs (the modified calyx segments).

1. Plants with a taproot and basal leaves tapering gradually to the petiole; inflorescence rather narrow and elongated.....(3) V. edulis
1. Plants with fibrous roots from a short horizontal rhizome; basal leaves, if present, abruptly narrowed to the petiole; inflorescence hemispheric or flat-topped.....2



r. *Perideridia gairdneri* s. *Sanicula marilandica* t. *S. graveolens* u. *Sium suave*

2. Flowers 4-7 mm long; basal leaves often lacking; middle stem leaves largest.....(2) V. sitchensis
 2. Flowers 2-4 mm long; basal leaves present; lower stem leaves largest.....(1) V. dioica

1. Valeriana dioica L.

Mountain Valerian

Mountain valerian has fibrous roots from a short rhizome, glabrous foliage, and stems 10-30 cm (4-12 in) tall. The basal leaves have long petioles and undivided spoon- to lance-shaped blades up to 8 cm (3 in) long. The 2-4 pairs of stem leaves are reduced and nearly sessile above. The inflorescence is hemispheric and compact at first but becomes more open at maturity. Individual plants have either bisexual or female flowers. White corollas are 2-4 mm long, and the plumes at the tip of the glabrous, lance-shaped fruit are up to 15 mm long.

This species is common in forests and meadows of the foothills and montane zone, rarely up to timberline. Circumboreal, south in w. North America to WA, ID, and WY.

A few tall specimens approach V. occidentalis Heller and may be transitional to this species.

2. Valeriana sitchensis Bong

Sitka Valerian

This species has a thick rhizome and stems usually up to 40 cm (16 in) tall but sometimes twice as high. Stem leaves are pinnately divided with an enlarged terminal lobe up to 10 cm (4 in) long. The middle leaves are usually the largest, but if basal leaves occur, they are larger and sometimes undivided. Bisexual flowers are borne in a branched, compact, flat-topped inflorescence that becomes more open with age. The pale lavender-pink corollas are 4-7 mm long, and the glabrous fruits have plumes, 12-20 mm long, at the tip.

Sitka valerian is locally common in moist meadows and open forests from the montane zone to near timberline. AK to CA, east to central ID and w. MT.

This is the most aromatic of our three species.

3. Valeriana edulis Nutt.

Tobacco Root, Edible Valerian

Tobacco root has a thick taproot with a branched crown and sturdy stems up to 1 m (3 ft) tall. Basal leaves, 7-40 cm (3-16 in) long, have entire-margined, lance-shaped blades that gradually taper to the petiole. Stem leaves are similar or pinnately divided, becoming reduced and sessile upward. The firm leaves have nearly parallel veins and densely short-hairy margins that appear white. Bisexual or unisexual flowers are borne in a narrow, openly branched inflorescence with branches arising in pairs from the base of narrow bracts. White to yellowish corollas are 2-4 mm long in bisexual and male flowers but only 1 mm long in females. The hairy, narrowly elliptical fruits, 2-5 mm long, have plumes that are 9-13 mm long.

This species is locally common in moist meadows of the Sapphire Range and along the West and Nez Perce forks of the Bitterroot River in the montane and subalpine zones. Our largest specimens come from along the Bitterroot River south of Lolo where it occurs with Thalictrum dasycarpum. B.C. to w. MT, south to Mex.; Ont., and central U.S.

VERBENACEAE Vervain Family

Verbena L. Vervain

Members of this genus are perennials with opposite, toothed leaves. Flowers, each subtended by a narrow bract, are borne in terminal, sometimes branched spikes. The calyx is 5-lobed, and the corolla is tubular with 5 flaring lobes. There are usually 4 stamens and a single style. The fruit is a cluster of 4 nutlets.

1. Flowers greatly surpassed by subtending bracts; stems lax or prostrate.....(1) V. bracteata
 1. Flowers longer than subtending bracts.....2
 2. Leaves sessile or nearly so with elliptic blades; inflorescence of 1-few spikes.....(3) V. stricta
 2. Leaves lance-shaped with a definite petiole; inflorescence of numerous spikes.....(2) V. hastata

1. Verbena bracteata Lag. & Rodr.

Bracted Vervain

Bracted vervain has a taproot and several coarsely hairy, prostrate or lax stems 20-50 cm (8-20 in) long. The leaves have winged petioles and toothed and deeply divided blades 2-5 cm (1-2 in) long. The inflorescence has narrow, leaflike bracts that surpass the flowers. The blue or purple corollas are about 4 mm long.

This species is common in compacted soil of open, disturbed habitats, particularly road shoulders. B.C. to ME, south to FL, Mex., and CA.

2. Verbena hastata L.

Blue Vervain

This vervain has fibrous roots and mostly single, erect, spreading-hairy stems up to 1.5 m (5 ft) tall. The leaves have short petioles and lance-shaped blades, 5-10 cm (2-4 in) long, with sharply toothed margins. Sessile flowers, subtended by inconspicuous bracts, are borne in numerous spikes of the branched inflorescence. The violet corollas are 3-4 mm long.



o. *Urtica dioica* p. *Plectritis macrocera* q. *Valeriana dioica* r. *V. sitchensis* s. *V. edulis*
t. *Verbena bracteata* u. *V. hastata*

Blue vervain occurs on stream banks and in moist meadows. It has been collected northwest of Hamilton. Most of the U.S. and s. Can.

3. Verbena stricta Vent.

Hoary Vervain

Hoary vervain is a short-lived perennial with a taproot and 1-several erect, simple or branched stems 20-120 cm (8-48 in) tall. The leaves are sessile or nearly so and have strongly veined, broadly elliptical blades 3-10 cm (1-4 in) long. Sessile flowers, each subtended by a small bract, are borne in 1-few terminal spikes. The blue to purple corollas are 6-7 mm long.

This species has been collected on the southern edge of Missoula. Native to central U.S. and introduced both west and east.

VIOLACEAE Violet Family

Viola L. Violet

These are low-growing, perennial or annual herbs with rootstocks and with or without leafy stems. Leaves are spade-shaped and basal or alternate on the stems with membranous, winglike appendages at the base of the petiole. Bisexual, nodding flowers are borne singly on the ends of stems. Each flower has 5 unequal sepals and 5 separate petals: 2 upper, 2 lateral that are bearded near the base, and 1 lower that is prolonged into a nectar-holding pouch (spur) at the base. There are 5 stamens with short broad anther filaments. Seeds are forcibly ejected from the egg-shaped capsules. Most species also possess small, self-fertilizing flowers that do not open.

1. Annual garden escape found in disturbed areas.....(10) V. arvensis
1. Native perennials.....2
2. Petals predominantly yellow on the inner surface.....3
2. Petals predominantly blue, violet or white on the inner surface.....6
3. Leaves and flowers borne on the upper half of an erect stem, naked below.....(6) V. glabella
3. Leafy stems, if present, with leaves on the lower half.....4
4. Leaf blades nearly round.....(8) V. orbiculata
4. Leaf blades lance-shaped to elliptic or narrowly spade-shaped, longer than wide.....5
5. Leaf blades thick, purplish beneath with coarsely toothed margins.....(9) V. purpurea
5. Leaf blades thin with finely toothed or entire margins.....(7) V. nuttallii
6. Petals predominantly blue or violet on the inner surface.....7
6. Petals predominantly white on the inner surface.....8
7. Leafy stems present, sometimes short; spur 1/2 as long as lower petal.....(1) V. adunca
7. Leafless flowering stems arising directly from the roots; spur 1/3 as long as lower petal or shorter.....(2) V. nephrophylla
8. Plants with leafy stems up to 40 cm (16 in) tall.....(3) V. canadensis
8. Leafless flowering stems arising directly from the roots.....9
9. Upper petals usually tinged with violet on the back; leaves often >25 mm (1 in) wide.....(5) V. palustris
9. Upper petals white on the outside; leaves usually <25 mm wide.....(4) V. macloskeyi

Group I. Perennial species with violet or blue flowers.

1. Viola adunca Smith

Western Violet

This species has leafy stems up to 15 cm (6 in) tall with lance- to narrowly spade-shaped leaves 1-3 cm wide. Flowers are 5-15 mm long with a narrow spur half as long as the lower petal. The lateral petals have white hairs.

Var. adunca has hairy leaves and stems up to 15 cm (6 in) long. It is common in open forests, meadows and forest edges from the valleys to the montane zone. Var. bellidifolia (Greene) Harr. is smaller with glabrous leaves and stems less than 5 cm (2 in) tall. It is common in meadows of the upper subalpine and timberline zones. Widespread in much of North America.

2. Viola nephrophylla Greene

Bog Violet

The leaves and naked flower stems, up to 25 cm (10 in) tall, arise from shallow fleshy rhizomes. Leaves have long petioles and spade-shaped blades, 2-5 cm (1-2 in) wide, with shallowly toothed margins. Flowers are 10-20 mm long with a short spur and lower petals that are white at the base.

VIOLACEAE

Bog violet is common in moist to wet, open or partially shaded habitats, often beneath deciduous trees, shrubs, or grasses in the valley and montane zones. B.C. to Newf., south to CA, NM, MN and NY.

Group II. Perennial species with mostly white flowers.

3. Viola canadensis L.

Canadian Violet

This species has leafy stems up to 40 cm (16 in) tall from a rootstock with slender runners. Leaves have long petioles and broadly spade-shaped blades. Stalked flowers are borne in the axils of the stem leaves. Flowers are about 15 mm long with a short spur. Petals have yellow bases, the lower with purple lines and the upper purple tinged on the back.

Canadian violet is locally common in moist stream bottoms in the valley and montane zones north of Missoula and in the northern Sapphire Range. AK to OR, east to NM and much of ne. U.S. and adjacent Can.

4. Viola macloskeyi Lloyd

Small White Violet

This violet has leaves and naked flower stalks, 3-6 cm (1-2 in) tall, arising from slender rootstocks and runners. The spade-shaped leaves are 1-3 cm long. Flowers are 5-10 mm long with a distinct spur, and the lower petals have purple lines toward the base.

Var. macloskeyi with leaf blades less than 25 mm (1 in) wide, is locally common in wet, boggy open or partially shaded habitats up to timberline. Var. pallens (Banks) Hitchc. has larger leaves and has been collected along Rattlesnake Creek north of Missoula. Throughout much of mountainous North America.

5. Viola palustris L.

Marsh Violet

Marsh violet is similar to V. macloskeyi with leaves and naked flower stems arising from rhizomes and runners, but the whole plant is less compact. The leaves have petioles up to 15 cm (6 in) long and broadly spade-shaped blades. Flowers are 10-13 mm long with a distinct spur. Lower petals have purple lines, and the upper ones are usually tinged with purple on the back.

Locally common in wet meadows from the valley to the lower subalpine zone. B.C. to CA, east to Lab., ME, and NM. Also found in Europe and w Siberia.

Group III. Perennial species with yellow flowers.

6. Viola glabella Nutt.

Pioneer Violet

Stems up to 30 cm (12 in) tall, with leaves only near the top, arise from scaly, fleshy rootstocks. The leaves have petioles, 10-20 cm (4-8 in) long with broadly spade-shaped blades. Flowers, 8-14 mm long, are borne on long stalks in the axils of the stem leaves. The spur is short, and the lower 3 petals have purple lines within.

Pioneer violet is common in moist forests from low elevation creek bottoms through the montane zone. AK to CA, east to MT; Asia.

7. Viola nuttallii Pursh

Nuttall's Violet

Nuttall's violet has short, leafy stems up to 15 cm (6 in) tall from rootstocks without rhizomes or runners. The leaves have winged petioles, 3-15 cm (1-6 in) long, and lance-shaped to elliptical blades up to 10 cm (4 in) long, narrower than other violets. Flowers are 5-15 mm long. The upper petals are brownish on the back, and the lower have dull purple lines.

Var. major Hook., with hairy fruits and leaf blades more than 5 cm (2 in) long is common in grasslands, shrublands, and open ponderosa pine forests of the foothills, occasionally up to the subalpine zone. Var. vallicola (A. Nels.) St. John has glabrous capsules and smaller leaves. It is common in grasslands and other open habitats in the valleys and foothills. Intermediates between the varieties are common. B.C. to CA, east to central U.S.

8. Viola orbiculata Geyer

Round-leaved Violet

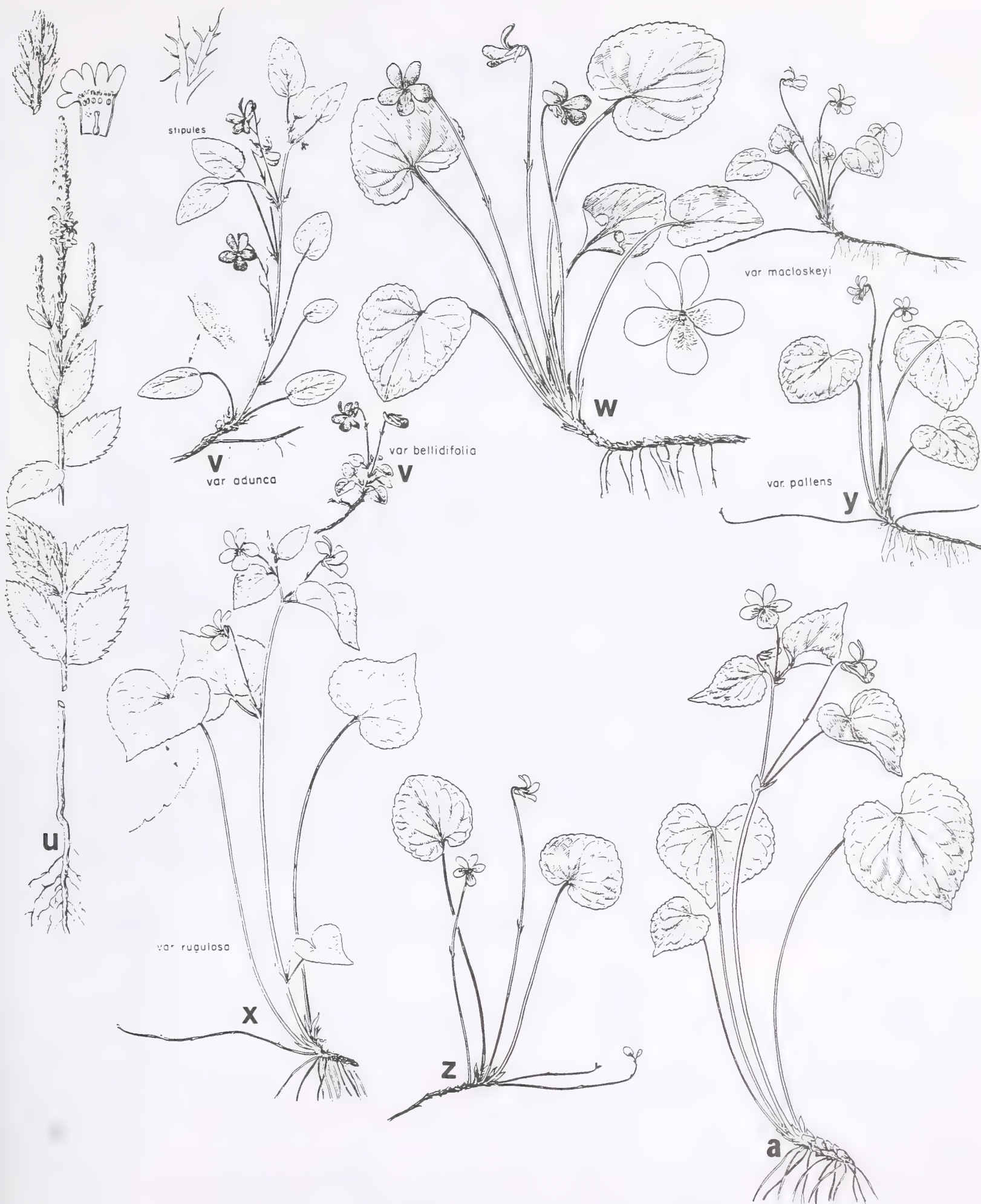
Round-leaved violet has leafy stems up to 5 cm (2 in) from rootstocks without stolons. The thin leaves have nearly round blades, 2-4 cm wide, that often remain green through the winter. Flowers are pure yellow and 5-15 mm long with a short spur.

This small violet is characteristic of moist, coniferous forests from the creek bottoms to the subalpine zone. B.C. to OR, east to Alta. and MT.

9. Viola purpurea Kell.

Yellow Mountain Violet

A violet with leaves and leafy stems, up to 8 cm (3 in) tall, from the ends of long, scaly rhizomes. The leaves have long petioles and thick, broadly lance-shaped blades, 2-5 cm (1-2 in) long, that are deeply toothed and purple with short hairs beneath. Flowers are 5-12 mm long with an indistinct spur. The petals have brownish lines on the inside.



u. *Verbena stricta* v. *Viola adunca* w. *V. nephrophylla* x. *V. canadensis* y. *V. macloskeyi* z. *V. palustris*
a. *Viola glabella*

VITACEAE

This distinctly different species is infrequent in vernal moist, sandy or gravelly soil in the montane zone to near timberline in the southern part of our area. WA to CA, east to MT, CO, and AZ.

Group IV. A single, annual garden escape

10. Viola arvensis Murr.

Wild Pansy

The wild pansy has erect or lax, branched stems up to 30 cm (12 in) tall. The lance-shaped leaves are deeply toothed and up to 3 cm (1 in) long. Flower stems arise from among the large leaflike appendages (stipules) at the base of the petioles. The upper petals are mostly white or light yellow but may also be purple.

This European introduction became weedy in some of the gardens in our area. Introduced in much of the U.S. and Can.

VITACEAE Grape Family

Parthenocissus Planch. Virginia Creeper

Parthenocissus quinquefolia (L.) Planch.

Virginia Creeper

Virginia creeper is a woody, climbing vine attaching itself to its support by means of 3-8 curving branch ends (tendrils) with adhesive disks. The alternate leaves are palmately divided into 5 elliptical to oblong leaflets, up to 15 cm (6 in) long, with toothed margins on the upper half. Numerous bisexual flowers are borne in branched, flat-topped inflorescences arising from the upper leaf axils. Each radially symmetrical flower has a minute calyx and 5 green, separate petals 2-3 mm long. There are 5 stamens and a single style. The fruit is a bluish-purple berry, 5-7 mm wide, with a whitish waxy coating.

A frequently cultivated plant, it occasionally escapes in moist riparian forests and thickets, such as Jacob's Island near the university campus in Missoula and the railroad embankment south of Hamilton. ME to SD, south to FL and TX; introduced in our area.

Virginia creeper turns a flaming scarlet in early fall and is often used as an ornamental on the outside of houses. The berries are voraciously eaten by birds. (Not illustrated).

DIVISION ANTHOPHYTA, FLOWERING PLANTS

CLASS LILIOPSIDA, "MONOCOTS"

ALISMATACEAE Water Plantain Family

Members of this family are mostly aquatic, perennial herbs with enlarged, tuberlike bases, fibrous roots, and basal leaves that sheath the erect stems. Submersed leaves are often ribbonlike, while emergent leaves have lance- to egg-shaped blades. Stalked flowers are borne in leafy-bracted whorls at the top of the stem. They are bisexual or sometimes unisexual with 3 petals and 3 sepals of nearly the same length. There are 6 or more stamens and numerous styles. The fruit is a cluster of coated seeds (achenes).

- 1. Emergent or floating leaves with arrowhead-shaped blades (2 lobes at the base).....Sagittaria
- 1. Emergent or floating leaves with elliptical or lance-shaped blades.....Alisma

Alisma L. Water Plantain

These perennial herbs have lance-shaped to elliptical leaf blades. The flowers occur on branches that are whorled on top of the stem. They have white or pinkish petals and 6 stamens. Achenes are flattened.

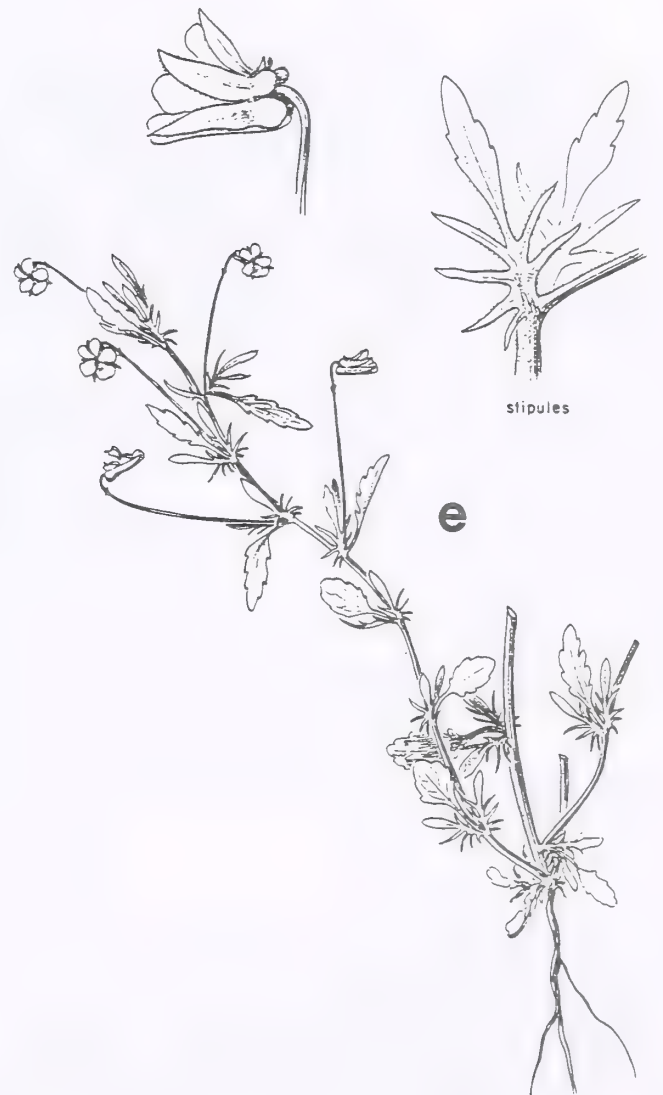
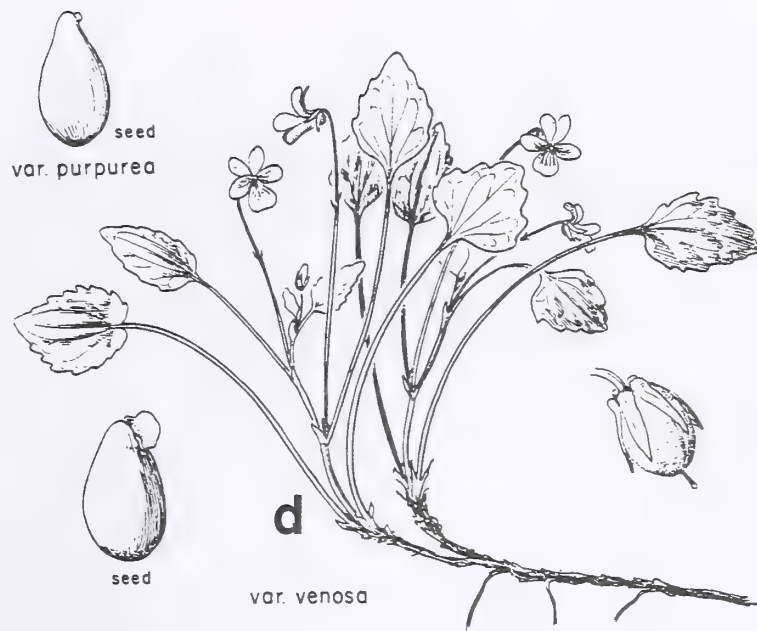
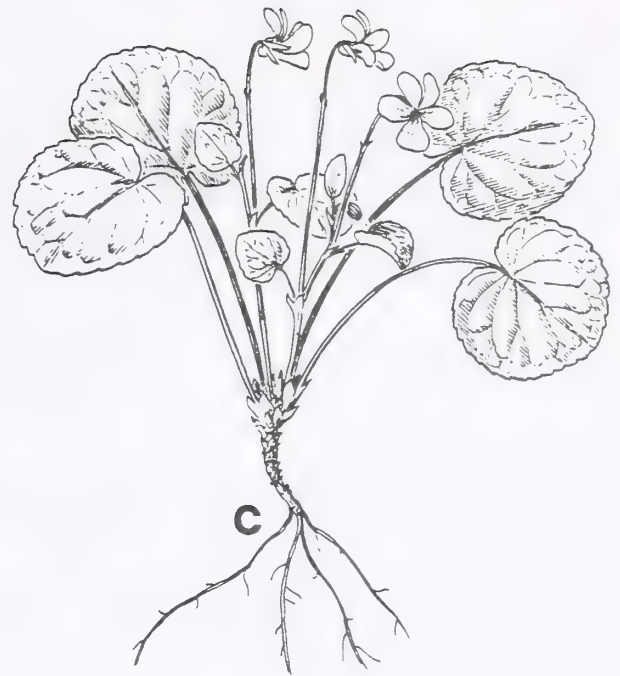
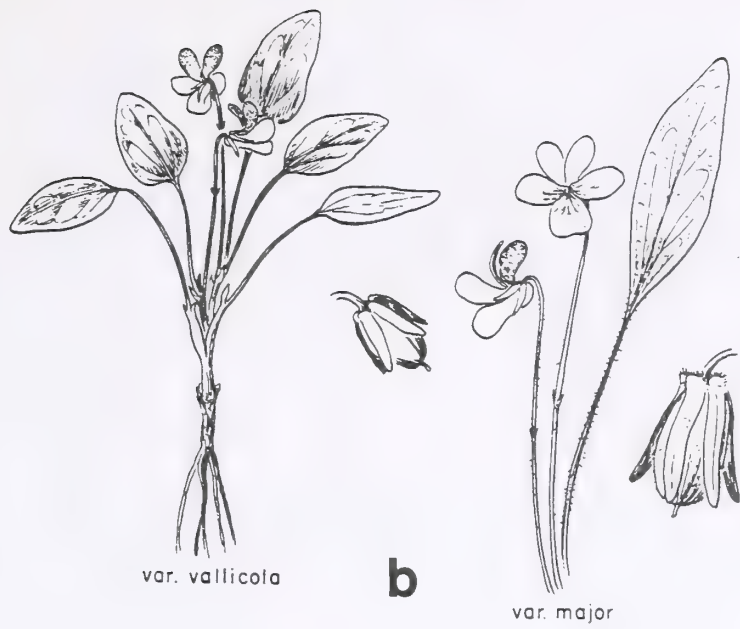
- 1. Inflorescence surpassing the leaves, leaf blades mostly >3 cm (1 in) wide.....(1) A. plantago-aquatica
- 1. Leaves surpassing the inflorescence, blades mostly <3 cm wide.....(2) A. gramineum

1. Alisma plantago-aquatica L.

American Water Plantain

It has stems up to 1 m (3 ft) tall that greatly surpass the broadly lance- to egg-shaped leaves that are 3-15 cm (1-6 in) wide. Flowers are borne in an open, highly branched inflorescence. Sepals are shorter than the 4-6 mm long petals. Flattened, egg-shaped achenes are 2-3 mm long.

American water plantain is common in marshy habitats of our river valleys. Nearly cosmopolitan; B.C. to ME, south to CA, AZ, MO, and NY.



b. *Viola nuttallii* c. *V. orbiculata* d. *V. purpurea* e. *V. arvensis*

CYPERACEAE

2. Alisma gramineum Gmel.

Narrow-leaved Water Plantain

This water plantain has stems up to 50 cm (20 in) tall that are surpassed by the leaves. The linear to narrowly lance-shaped blades are less than 3 cm (1 in) wide, held erect when emerged, but lax and floating when submersed. Flowers are borne in an open, branched inflorescence. Sepals, 2-3 mm long, are slightly smaller than the petals. Flattened achenes are nearly orbicular and about 2 mm wide.

Locally common in shallow water of sloughs in the Missoula area. B.C. to NY, south to CA, CO, MN, and NY; Eurasia, Africa.

Sagittaria L. Arrowhead

Sagittaria cuneata Sheld.

Arumleaf, Arrowhead, Wapato

Wapato is an often rhizomatous and tuber-bearing perennial up to 50 cm (20 in) tall. The submersed leaves are ribbonlike. Leaf blades near or above the surface have arrowhead-shaped blades up to 6 cm (2 in) wide. Stalked, bisexual or unisexual flowers are borne in whorls on the top of the stems. Sepals, 5-8 mm long, are shorter than the white petals. There are numerous stamens and styles. The egg-shaped achenes are 2-3 mm long with a small beak at the top.

Common in marshy areas and around ponds and slow-moving streams in the valley zone. B.C. to N.S., south to CA, NM, TX, IL, and NY.

CYPERACEAE Sedge Family

Members of this family are perennial or occasionally annual, grasslike plants with alternate leaves and mostly solid, triangular or (less commonly) round stems. The small flowers are unisexual or bisexual, borne in the axils of scalelike structures, and grouped together in spikes. The petals and sepals are absent or reduced to bristles. Each flower usually has three stamens and 2 or 3 stigmas that surmount a 1-seeded ovary. The ovary develops into a hard, dry, 2- or 3-sided fruit (achene) that closely encloses the single seed.

Species of this family are often confused with grasses (Family Gramineae) and rushes (Family Juncaceae). Grasses generally have round, hollow (except at the nodes) stems and a characteristic flower cluster consisting of two glumes subtending 1-many flowers, each with a lemma or palea. Members of the Rush Family have round stems and small, lilylike flowers with 3 petals, 3 sepals, and 6 stamens.

1. Achene (seed) enclosed in a saclike envelope (perigynium); flowers unisexual.....Carex
1. Achene not enclosed in a perigynium; flowers bisexual.....2
2. Spikelets (tightly grouped clusters of flowers) flattened.....Cyperus
2. Spikelets round or nearly so in cross section.....3
3. Each flower with >10 long bristles; spikelets appearing like balls of cotton.....Eriophorum
3. Flowers with <10 bristles; spikelets not resembling cotton.....4
4. Spikelets solitary at the tip of the stems.....Eleocharis
4. Spikelets >1 per stem (Scirpus americanus may have 1 spikelet but it appears lateral).....5
5. Spikelets linear, arranged in open, 2-sided spikes in the axils of the leaves.....Dulichium
5. Spikelets elliptical or ovate in outline; inflorescence not as above.....Scirpus

Carex L. Sedge

Sedges are perennial, grasslike plants with creeping rhizomes, short rootstocks, or fibrous roots. The solid (not hollow) stems are usually triangular in cross section, and the leaves at the base of the stems are often reduced to scales. The long, narrow leaves have a lower portion that surrounds the stem (sheath) and are arranged in 3 ranks. The small, reduced flowers are unisexual, and each is subtended by a single scale. Pistillate (female) flowers consist of an ovary with 2-3 stigmas enclosed in a saclike structure (perigynium). The fruit, enclosed in the perigynium, is a 2- or 3-sided, double-walled seed (achene). The staminate (male) flowers consist of 3 stamens. Flowers are aggregated in 1-several, sessile or stalked spikes. Individual spikes may be unisexual or bisexual, and these different kinds of spikes may be borne in a single, open or congested inflorescence.

With over 75 species, Carex is the largest genus in our area. Many of the species are difficult to tell apart, and a technical key should always be consulted. Mature fruit and a hand lens are necessary for positive identification of most species.



a. *Alisma plantago-aquatica* b. *A. gramineum* c. *Sagittaria cuneata*

Key to the Groups of Carex

1. Inflorescence of a solitary, terminal spike.....GROUP A
1. Inflorescence of 2 or more spikes.....2
2. Stigmas 2, achene 2-sided in cross section (lens-shaped) [remove a perigynium and squeeze the achene out between two fingers; in mature specimens, stigmas may have broken off].....3
2. Stigmas 3 (4 in C. concinnoides); achene triangular in cross section.....5
3. Spikes elongated and cylindrical, usually at least the lower ones stalked; terminal spike usually entirely staminate.....GROUP B
3. Spikes sessile and relatively short; at least the terminal spike usually bisexual (C. douglasii with unisexual plants is included here).....4
4. Spikes with the staminate flowers (these can usually be detected by the presence of old, dried-up anther sacs) at the tip of the spike (C. douglasii with unisexual plants is included here).....GROUP C
4. Spikes with the staminate flowers at the base of the spike.....GROUP D
5. Perigynia hairy.....GROUP E
5. Perigynia glabrous.....GROUP F

GROUP A

1. Stigmas 3; achene triangular in cross section.....2
1. Stigmas 2; achene 2-sided in cross section (lens-shaped).....3
2. Plants without rhizomes, forming dense tufts with numerous broken-off, old stems at the base; dry, exposed; alpine habitats.....(74) C. nardina
2. Plants with rhizomes; stems arising singly or few together; wet habitats.....(58) C. dioica
3. Spikes with only 1-3 perigynia; achene generally 4-5 mm long.....(2) C. geyeri
3. Spikes with more than 3 perigynia; achene usually <4 mm long.....4
4. Perigynia hairy, at least above the middle.....5
4. Perigynia glabrous.....6
5. Spike with a distinct staminate portion above the pistillate portion.....(10) C. filifolia
5. Spike entirely or very nearly all staminate or pistillate.....(67) C. scirpoidea
6. Pistillate scales, at least the lower ones, falling as the perigynia approach maturity.....7
6. Pistillate scales not deciduous.....8
7. Plants forming dense tufts without rhizomes.....(65) C. pyrenaica
7. Plants rhizomatous with stems arising singly or in small, loose tufts.....(62) C. nigricans
8. Perigynia relatively large, >4 mm; leaves not curled at the tip.....(68) C. breweri
8. Perigynia smaller, <4 mm; many leaves curled at the tip.....(75) C. rupestris

GROUP B

1. Perigynia inflated, beakless, and golden-brown at maturity.....(21) C. aurea
1. Perigynia sometimes inflated but always with at least a small beak, color of perigynia at maturity not golden brown.....2
2. Perigynia with longitudinal nerves on the faces.....3
2. Perigynia lacking nerves on the faces.....4
3. Plants strongly rhizomatous; leaves bluish-green and generally >4 mm wide.....(16) C. nebrascensis
3. Plants densely tufted without long rhizomes; leaves generally <4 mm wide.....(39) C. lenticularis
4. Mature perigynia inflated and copper-colored.....(44) C. aperta
4. Mature perigynia slightly if at all inflated, usually not copper-colored.....5
5. Bract at the base of the inflorescence shorter than the terminal spike.....6
5. Bract at the base of the inflorescence at least equal to the terminal spike.....7

- 6. Perigynia (excluding beak) rounded on top; plants forming dense sod.....(19) C. scopulorum
- 6. Perigynia more pointed on top; plants densely tufted, not sod-forming.....(49) C. prionophylla
- 7. Perigynia greenish, sharply contrasting with the dark pistillate scales.....(48) C. aquatilis
- 7. Perigynia brownish, not sharply contrasting with the brownish scales.....(61) C. saxatilis

GROUP C

- 1. Spikes widely separated with <5 perigynia; perigynia nearly round in outline.....(5) C. disperma
- 1. Spikes with >5 perigynia; perigynia more elliptical or lance-shaped.....2
- 2. Spikes generally all unisexual.....(9) C. douglasii
- 2. Most spikes containing both staminate and pistillate flowers.....3
- 3. Plants rhizomatous, stems arising singly or few together.....(12) C. stenophylla
- 3. Plants forming tufts without long rhizomes.....4
- 4. Inflorescence unbranched, compact, and ca. elliptical in outline.....5
- 4. Inflorescence elongate and often tightly branched.....6
- 5. Perigynia elliptical in outline, tapered at both ends.....(11) C. hoodii
- 5. Perigynia pear-shaped, broadest at the base.....(8) C. neurophora
- 6. Inflorescence with long, conspicuous, narrow, leaflike bracts.....(30) C. vulpinoidea
- 6. Inflorescence with inconspicuous bracts.....7
- 7. Perigynia relatively large, >4 mm long.....(40) C. stipata
- 7. Perigynia smaller, generally <4 mm long.....8
- 8. Leaves narrow, 1-3 mm wide; lower leaf sheaths not copper-colored.....(43) C. diandra
- 8. Leaves wider, 3-4 mm wide; lower leaf sheaths copper-colored.....(42) C. cusickii

GROUP D

- 1. Perigynia with winged margins.....2
- 1. Perigynia sometimes thin-edged but lacking distinct winged margins.....19
- 2. Bract subtending the inflorescence longer than the inflorescence.....(18) C. athrostachya
- 2. Bract subtending the inflorescence shorter than or sometimes equal to the inflorescence.....3
- 3. Beak of perigynium flattened, wing-margined and toothed on the edges to the tip.....4
- 3. Beak of perigynium slender and round in cross section, the tip not serrate.....9
- 4. Perigynium relatively narrow, >3 times as long as broad.....5
- 4. Perigynium broader, generally <3 times as long as broad.....6
- 5. Perigynium ca. 1 mm wide.....(28) C. crawfordii
- 5. Perigynium > 1 mm wide.....(31) C. scoparia
- 6. Spikes closely clustered in a globose head.....(26) C. brevior
- 6. Spikes more loosely clustered, not in a globose head.....7
- 7. Convex face of perigynium with 10 or more nerves.....(15) C. xerantica
- 7. Convex face of perigynium with <10 nerves.....8
- 8. All but the lowest 1-2 spikes closely congested in the inflorescence.....(20) C. bebbii
- 8. Spikes more loosely aggregated, lower 3-4 well-separated.....(23) C. tenera
- 9. Perigynia mostly 6-8 mm long.....(13) C. petasata
- 9. Perigynia <6 mm long.....10
- 10. Perigynia relatively small, ca. 3 mm long or less.....11
- 10. Perigynia >3 mm long.....12
- 11. Perigynium only slightly wing-margined, margins without small serrations.....(51) C. illota
- 11. Perigynium definitely wing-margined and serrate along the edges.....(52) C. limnophila

CYPERACEAE

12. Pistillate scales distinctly shorter and narrower than the perigynia, upper margins and tip of perigynia exposed.....13
12. Pistillate scales about as long and wide as the perigynia, only the very tip of the perigynia exposed.....16
13. Perigynia narrow, >3 times as long as broad.....(28) C. crawfordii
13. Perigynia broader, <3 times as long as broad.....14
14. Winged margins narrow, perigynium nearly filled by the seed.....(17) C. pachystachya
14. Seed filling only the center of the perigynium, winged margins broader.....15
15. Perigynia <5 mm long.....(7) C. microptera
15. Perigynia >5 mm long.....(66) C. haydeniana
16. Perigynia relatively large, ca. 6-8 mm long.....(13) C. petasata
16. Perigynia smaller, 3-6 mm long.....17
17. Perigynia very narrowly lance-shaped, 3-4 mm long, with indistinct winged margins..(53) C. leporinella
17. Perigynia narrowly elliptic, 4-7 mm long, with well-defined winged margins.....18
18. Lower spikes of inflorescence well-separated; plants of valley to lower subalpine zones.....(25) C. praticola
18. Lower spikes more congested; plants of upper subalpine to alpine zones.....(64) C. phaeocephala
19. Inflorescence usually with >7 spikes.....(32) C. arcta
19. Inflorescence usually with <7 spikes.....20
20. Spikes crowded in a elliptical or globose head.....21
20. Spikes in a more open, elongate inflorescence.....22
21. Perigynia spreading away from the axis of the spike at maturity.....(51) C. illota
21. Perigynia held erect at maturity.....(71) C. bipartita
22. Perigynia spreading at nearly right angles from the axis of the spike at maturity.....23
22. Perigynia erect or ascending at maturity.....24
23. Beak of perigynium relatively short, <1/2 the length of the body.....(22) C. interior
23. Beak of perigynium longer, >1/2 the length of the body.....(24) C. muricata
24. Pistillate scales deep brown.....(59) C. praeceptorum
24. Pistillate scales whitish, greenish, or light brown.....25
25. Beak of perigynia usually 1-2 mm long.....(4) C. deweyana
25. Beak of perigynia shorter, rarely up to 1 mm long.....26
26. Spikes usually with (10)15-30 perigynia.....(22) C. canescens
26. Spikes usually with 5-10(15) perigynia.....27
27. Perigynia relatively small, <2.5 mm long; beak <0.5 mm long.....(60) C. brunnescens
27. Perigynia larger, >2.5 mm long; beak >0.5 mm long.....(6) C. laeviculmis

GROUP E

1. Pistillate spikes all relatively short, not >15 mm long.....2
1. Pistillate spikes elongate, at least some >15 mm long4
2. Some of the pistillate spikes borne on short stalks among the basal leaves.....(3) C. rossii
2. Pistillate spikes all borne at the top of the stems above the basal leaves.....3
3. Bract subtending lowest spike <1 cm long; plants usually of forest habitats.....(1) C. concinnoides
3. Bract subtending lowest spike >1 cm long; plants of grassland habitats.....(14) C. pensylvanica
4. Body of perigynia only sparsely hairy.....(46) C. luzulina
4. Body of perigynia velvety-hairy.....5
5. Leaves flat or nearly so, larger ones 2-5 mm wide.....(37) C. lanuginosa
5. Leaves rolled, appearing round in cross section, <1 mm wide.....(38) C. lasiocarpa

GROUP F

1. Perigynia shiny, inflated, and long-beaked; spikes >15 mm wide with numerous perigynia.....2
1. Perigynia not shiny and inflated; spikes often <15 mm wide.....5
2. Section of leaf sheathing the stem distinctly hairy.....(36) *C. atherodes*
2. Leaf sheaths glabrous or nearly so.....3
3. Perigynia held at an ascending angle to the axis of the spike.....(34) *C. vesicaria*
3. Perigynia widely spreading at maturity.....4
4. Spikes closely aggregated; leafy bract subtending lowest spike >twice as long as the inflorescence.....(35) *C. retrorsa*
4. Spikes well separated; lowest bract <twice as long as the inflorescence.....(33) *C. rostrata*
5. Perigynia with a conspicuous beak ca. 1-2 mm long.....6
5. Perigynia with a short beak <1 mm long.....7
6. Perigynia small, ca. 2-3 mm long, with a nearly straight beak.....(27) *C. oederi*
6. Perigynia larger, ca. 4-6 mm long, at least some with a curved beak.....(41) *C. flava*
7. Terminal spike staminate or with a few pistillate flowers at the base.....8
7. Terminal spike with pistillate flowers above staminate flowers.....16
8. Spikes (at least lower ones) arched or nodding on slender stalks.....9
8. Spikes erect or nearly so.....13
9. Leaflike bracts subtending the spikes without lower portion sheathing the stem.....10
9. Leaflike bracts subtending spikes with lower portion sheathing the stem.....12
10. Only the lowest 1-2 spikes nodding, uppermost pistillate spikes erect.....(50) *C. spectabilis*
10. All pistillate spikes nodding on slender stalks.....11
11. Leaves at base of stem reduced to scales; main leaves channeled; bract subtending lowest spike shorter than or equal to the inflorescence.....(56) *C. limosa*
11. Leaves at the base of stem with long, flat blades; bract subtending lowest spike longer than the inflorescence.....(57) *C. paupercula*
12. Pistillate scales light brown or greenish.....(70) *C. capillaris*
12. Pistillate scales dark brown to black.....(46) *C. luzulina*
13. Perigynia narrowly lance-shaped.....(46) *C. luzulina*
13. Perigynia elliptical or ovoid.....14
14. Perigynia inflated, not at all flattened.....(54) *C. raynoldsii*
14. Perigynia strongly flattened, only the center distended by the seed.....15
15. Perigynia up to 1/2 as wide as long; stem leaves few to several.....(50) *C. spectabilis*
15. Perigynia >1/2 as wide as long; leaves mostly basal.....(63) *C. paysonis*
16. Plants rhizomatous, stems arising singly or few together; pistillate scales with awned tips.....(29) *C. buxbaumii*
16. Plants forming dense clumps; pistillate scales usually without awned tips.....17
17. Lower spikes arching or nodding on stalks.....18
17. Spikes all erect or nearly so.....20
18. Perigynia narrowly lance-shaped, ca. 1 mm wide, with a long, darkened beak.....(72) *C. misandra*
18. Perigynia narrowly elliptical to subrotund, >1 mm wide, with a short beak.....19
19. All or nearly all of the spikes long-stalked and nodding.....(45) *C. mertensii*
19. Only the lowest 1-2 spikes arching on stalks.....(47) *C. atrata*
20. Perigynia relatively small, 2-3 mm long; terminal spike <15 mm long.....(55) *C. norvegica*
20. Perigynia larger, 3-5 mm long; terminal spike usually >15 mm long.....21
21. Pistillate scales mostly as large or larger than the perigynia and concealing them...(73) *C. albonigra*
21. Pistillate scales mostly smaller than the perigynia exposing their beak and upper margins.....22

CYPERACEAE

22. Spikes sessile or nearly so, congested in a globose head.....(69) C. nova
 22. Inflorescence not so congested, lower spike(s) stalked.....(47) C. atrata

Group I. Sedges in this group occur in well-drained forested upland habitats.

1. Carex concinnoides Mack.

Northwest Sedge

This species has 1-few stems, 10-25 cm (4-10 in) tall, and tufted leaves, characteristically purplish-brown at the base, arising from creeping rhizomes. The basal leaves are usually 5-15 cm (2-6 in) long and 2-5 mm wide, mostly shorter than the stems. The loosely clustered inflorescence consists of a terminal, staminate spike, 8-20 mm long, and 1-2 pistillate spikes, about 10 mm long, below. Scales of the pistillate spikes are dark purple with whitish margins. The perigynia are short-hairy and 2-3 mm long with a short beak. The achene is 3- or 4-sided in cross section.

Northwest sedge occurs in forests from the valley to the subalpine zone. It is the most common sedge in dry ponderosa pine forests in the foothills and lower montane areas. B.C. to CA, east to Alta., w. MT, and ne. OR.

2. Carex geyeri Boott

Elk Sedge

Elk sedge has clustered stems, 15-30 cm (6-12 in) tall, arising from branched rhizomes. The leathery and partially evergreen leaves are 1-3 mm wide and as long or longer than the stems. The solitary spike has a slender, straw-colored, staminate part above the 1-3 distinctly separate pistillate flowers. Scales of the pistillate flowers are brown with a short awn at the tip. The greenish to brownish, glabrous perigynia are spoon-shaped and 5-6 mm long. The achene is 3-sided in cross section.

This sedge occurs from the foothills to timberline. It is one of the most common sedges in dry montane forests. B.C. to CA, east to Alta., MT, WY, and CO.

The developing stems are often eaten by bears, deer, and elk. Elk sedge is our only upland sedge with few-flowered, solitary spikes. This species is used as an indicator for one of the dry Douglas fir habitat types in western Montana.

3. Carex rossii Boott

Ross' Sedge

Some stems of this tufted species are short and hidden among the basal leaves, while the rest are up to 20 cm (8 in) tall and surpass the leaves. The inflorescence of the tall stems is subtended by a leaflike bract and consists of a slender, terminal, staminate spike, 5-12 mm long, and 3-5 short-stalked, pistillate spikes loosely clustered below. Only pistillate spikes occur on the short stems. The pistillate spikes are about 10 mm long and consist of 1-few green perigynia, each subtended by a light, reddish-brown scale. The finely hairy perigynia are 2-5 mm long, round in the middle, and tapered into a beak at either end. The achene is usually triangular in cross section.

The inconspicuous sedge is common but scattered in forests and openings from the valley to near timberline. Yuk. to CA, east to Man., MI, CO, and AZ.

Ross' sedge often occurs in open, disturbed soil near mining facilities as a pioneer plant.

Group II. This group contains species of moist or wet, often partly shaded forest openings.

4. Carex deweyana Schw.

Dewey's Sedge

Dewey's sedge forms dense clumps from short rootstocks and has weak, spreading stems 25-40 cm (10-16 in) tall. The leaves are 2-5 mm wide and occur mainly on the lower portion of the stem. The 3-10, light green or tan spikes are sessile, loosely aggregated above, and widely separated below. The lowest spikes are subtended by narrow, elongated, leaflike bracts. Each spike is 7-20 mm long with the staminate flowers at the base and 10-25 pistillate flowers above. Flower scales are straw-colored with a firm, green midrib. The narrow, green or tan perigynia are 3-5 mm long with a long, slender, 2-lobed beak. The achene is 2-sided in cross section.

A common sedge of moist slopes in the Bitterroot Mountains, mostly at 1220-1980 m (4,000-6,500 ft). B.C. and Mack. to CA, east to Newf., PA, IA, and NM.

5. Carex disperma Dewey

Soft-leaved Sedge

The weak, arching stems of this species are 10-40 cm (4-16 in) tall and arise singly or loosely clustered from slender, branching rhizomes. Leaves are flat, 1-2 mm wide, and borne on the lower part of the stem. The small, sessile spikes have male flowers above and female flowers below and are widely separated in the slender inflorescence. Below the few staminate flowers, each spike has 1-3 pistillate flowers subtended by a pale, papery scale. The elliptical perigynia are light green and 2-3 mm long with a short beak. The achene is 2-sided in cross section.

Locally common in swampy areas in the montane and subalpine zones. It is an indicator of the wettest forest environments. Circumboreal, south in North America to OR, NV, NM, IN, and NJ.



a. *Carex concinnoides* b. *C. geyeri* c. *C. rossii*

6. Carex laeviculmis Meinsh.

Smooth-stemmed Sedge

This sedge has clustered, slender, usually arching stems, 20-50 cm (8-20 in) tall, from a short, creeping rootstock. The tufted, mainly basal leaves are flat, 1-3 mm wide, and shorter than or equal to the stems in height. The 4-9 sessile spikes are tightly clustered at the top of the inflorescence and more remote below. Each is subtended by a short bract, or the lowest is sometimes as long as the inflorescence. The straw-colored or brownish spikes have staminate flowers at the base and 5-10 pistillate flowers above and are 4-9 mm long. The short pistillate scales are yellowish-brown with a green midrib. The light green or greenish-brown perigynia are elliptical and 2-4 mm long with a well-developed beak up to 1 mm long. The achene is 2-sided in cross section.

Smooth-stemmed sedge is locally abundant in boggy areas or along springs and streamlets up to the subalpine zone. AK to CA, east to W. MT and ne. OR.

7. Carex microptera Mack.

Small-winged Sedge

Small-winged sedge forms large, dense clumps with numerous stems up to 70 cm (30 in) tall. The flat leaves are shorter than the stems, 2-4 mm wide, and borne on the lower part of the stem. The dull brown inflorescence is composed of several sessile spikes in a compact globose or pyramid-shaped head subtended by a narrow, leaflike or much-reduced, papery bract. Each spike is about 10 mm long with staminate flowers at the base and pistillate flowers above. The light greenish or brown perigynia are thin-edged, pear-shaped, and 3-5 mm long. Each is subtended by a short, brown scale with a pale midrib. The achene is 2-sided in cross section.

One of our most common sedges, occurring in numerous different mesic habitats. From the floodplains and bottomlands to near timberline. B.C. to CA, east to Man., SD, and NM.

8. Carex neurophora Mack.

Nerved Sedge

The stiff, erect stems of nerved sedge are 20-60 cm (8-24 in) tall and clustered on short to elongated rootstocks with distinct clusters of basal leaves lacking. Leaves are flat, 1-3 mm wide, and shorter than the stem. The sheaths of the stem are usually pale with cross corrugations opposite the blade and green and white mottled below it. The 5-10 small, sessile spikes are densely aggregated in an ovoid to oblong head 10-25 mm long. Each spike has a few staminate flowers at the tip and several pistillate flowers below. The scales of the pistillate flowers are brown with a green midrib and shorter than the perigynia. The light to dark brown perigynia are lance-shaped and 3-4 mm long. They spread away from the axis of the spike at maturity. The achene is 2-sided in cross section.

This uncommon sedge has been collected only once in our area, in a moist forest opening with C. deweyana. WA to NV, east to W. MT, WY, and CO.

Group III. Species in this group occur in dry meadows and on open slopes at low to moderately high elevations.

9. Carex douglasii Boott

Douglas' Sedge

Stems of Douglas' sedge are 6-30 cm (2-12 in) tall and scattered on long, slender rhizomes. Leaves are flat or rolled, 1-3 mm wide, and shorter than the stems. They occur only on the lower portion of the stem, and both the rhizomes and the persistent sheaths of the lowest leaves are dull brown or black. Staminate and pistillate spikes are borne on separate plants. The numerous sessile spikes are closely aggregated into an egg-shaped (pistillate) or cylindrical (staminate) head 15-45 mm long. The stamens are usually conspicuous in the staminate heads. The pistillate scales are light brown with a green midrib and broad, pale margins. The pale brown perigynia are 3-5 mm long and pear-shaped with a prominent beak. The achene is 2-sided in cross section.

Most common in heavy, often compacted, near-neutral or alkaline soils in the foothills on the east side of the Bitterroot Valley. B.C. to CA, east to Man., NE, and NM.

The relatively large heads on the often short, scattered stems make this species distinctive.

10. Carex filifolia Nutt.

Thread-leaved Sedge

Thread-leaved sedge is densely tufted with slender, wiry stems up to 25 cm (10 in) tall. The stiff, mostly basal leaves are rolled inward and less than 1 mm wide. The solitary, narrow spike is 10-20 mm long with staminate flowers above the 5-15 pistillate flowers. The broad, grayish-brown, pistillate scales have conspicuous pale margins and conceal the developing perigynia until maturity. The straw-colored and sparsely hairy perigynia are 3-5 mm long, broadly lance-shaped, and abruptly rounded at the top with a short beak. The achene is triangular in cross section.

Common in dry grasslands in the valley and foothills. Yuk. to OR, east to Man., NE, and TX.

11. Carex hoodii Boott

Hood's Sedge

Hood's sedge forms conspicuous, bright green bunches with clustered stems 30-80 cm (12-34 in) tall. The flat leaves are 2-4 mm wide and borne on the lower part of the stem with the lowest ones reduced to



d. *Carex deweyana* e. *C. disperma* f. *C. laeviculmis* g. *C. microptera*



h. *Carex neurophora* i. *C. douglasii* j. *C. filifolia* k. *C. hoodii*

scales. Several small, sessile spikes are closely aggregated into a dark brown, egg-shaped head. Spikes have staminate flowers at the tip and pistillate flowers below. The pistillate scales are about the same length as the perigynia and have conspicuous, pale margins and a green midrib. The brown perigynia are 3-5 mm long and elliptical in outline with green margins. The achene is 2-sided.

Hood's sedge occurs from the valley to near timberline (Chaffin Lakes) and is locally common in mesic microsites in good-condition grasslands in the foothills. B.C. to CA, east to Sask., SD, and CO.

12. Carex stenophylla Wahl
[C. eleocharis Bailey]

Narrow-leaved Sedge

Narrow-leaved sedge has slender stems, 4-20 cm (2-8 in) tall, arising from long, creeping, dark brown rhizomes. The narrow leaves are borne near the base and rolled inward. The several, small spikes are clustered into an egg-shaped, light to dark brown head. Each spike has staminate flowers at the tip and few to several pistillate flowers below. The pistillate scales are brown with pale margins and a pointed tip. The dark brown or blackish perigynia are about 3 mm long and elliptical with a short, indistinct beak. The achene is 2-sided in cross section.

This small sedge occurs in shallow, rocky soils on exposed flats and ridge tops in the foothills. It is locally common in old jeep roads on Waterworks Hill and Mount Sentinel near Missoula. Primarily a Great Plains species; B.C. to OR and NV, east to NE, IA, and AZ.

13. Carex petasata Dewey

Liddon's Sedge

This is a densely tufted sedge with fibrous roots and erect stems 25-50 cm (10-20 in) tall. The flat leaves are 2-4 mm wide and mainly basal. The 3-6 sessile spikes are 9-18 mm long and loosely clustered in the inflorescence. Each spike has staminate flowers at the base and pistillate flowers above; the uppermost spike is often club-shaped. Pistillate scales are light reddish-brown with a pale midrib and translucent margins. The yellowish or greenish-brown perigynia are 6-8 mm long and lance-shaped with winged margins. The achene is 2-sided in cross section.

Common in wheatgrass-fescue grasslands in the foothills around Missoula and on the east slopes of the Sapphire Range. B.C. to OR, east to Sask. and CO.

14. Carex pensylvanica Lam.
[C. heliophylla Mack.]

Pennsylvania Sedge, Sun Sedge

This species forms small clumps on well-developed rhizomes and has stems 10-35 cm (6-14 in) tall. The flat leaves are 1-3 mm wide and are often taller than the stems. The 1-4 sessile spikes are borne in an open inflorescence with a narrow, leaflike bract, 1-3 cm long, subtending the lowest spike. The narrow terminal spike is staminate, and the lower ones are pistillate. The pistillate scales are pale or dark brown and about the same length as the perigynia. The densely hairy perigynia are 3-5 mm long and oval with a short beak at either end. The achene is triangular in cross section.

Pennsylvania sedge is common east of the Continental Divide in Montana and has been collected once in grasslands in the hills near Missoula. B.C. to CA, east to Ont. and NY; Asia.

This sedge resembles the more common C. concinnoides but can be distinguished by having a longer, leaflike, inflorescence bract and a longer staminate spike.

15. Carex xerantica Bailey

Dryland Sedge

Dryland sedge is densely tufted with stems, 30-70 cm (12-28 in) tall, from short, creeping rootstocks. The flat leaves are 2-4 mm wide and clustered near the base of the plant. The 3-6 sessile spikes are borne in a loosely aggregated inflorescence. Spikes have staminate flowers at the base and pistillate flowers above. The pistillate scales are papery in texture and pale brown with lighter margins and a firm midrib. The perigynia are 4-7 mm long and pear-shaped with a broad, flattened beak that is sharply lobed at the tip. The achene is 2-sided in cross-section.

This Great Plains species has been reported to occur in grasslands in the north part of our area. Alta. to UT and AZ, east to Man. and MN.

It is easily confused with the more common C. petasata but can be distinguished by the broad, flattened, 2-lobed beak of the perigynium.

Group IV. Sedges in this group occur in moist meadows, swales, bogs, and other wet, open habitats at low to mid-elevations.

7. Carex microptera Mack.

Small-winged Sedge

This species is common in moist mountain meadows. See description above.

9. Carex douglasii Boott

Douglas' Sedge

This plant occurs in moist alkaline meadows near Florence. See above for description.



l. *Carex stenophylla* m. *C. petasata* n. *C. pennsylvanica* o. *C. xerantica*

16. Carex nebrascensis Dewey

Nebraska Sedge

The sharply triangular stems of Nebraska sedge are 20-50 cm (8-20 in) tall, and they arise singly or a few together from long, thick, scaly rhizomes. The bluish-green leaves are 3-10 mm wide and usually shorter than the stems. The 3-7 cylindrical spikes are borne in a conspicuous, open inflorescence. The uppermost 1-2 spikes are sessile and staminate. The pistillate spikes are up to 7 cm (3 in) long and widely separated; the lower 1-2 are borne on short stalks and subtended by long, leaflike bracts that may be longer than the inflorescence. The pistillate scales are brownish or reddish-black with a pale midvein and translucent margins. The straw-colored perigynia are 3-4 mm long and elliptical in outline with a short beak and conspicuous nerves on the faces. The achene is 2-sided in cross section.

This sedge can be found in many wet, open habitats in the valley and lower mountains. It is a conspicuous component of many hay meadows in the Bitterroot Valley. B.C. to CA, east to Alta., KS, MO, and NM.

The blue-green color and coarse foliage are distinctive field characters.

17. Carex pachystachya Cham.

Thick-headed Sedge

[C. preslii Steud., C. macloviana var. pachystachya (Cham.) Kuek.]

These are tufted plants with short rootstocks and stems 20-60 cm (8-24 in) tall. The flat leaves are 2-5 mm wide and usually much shorter than the stems. The 4-12 sessile spikes are borne in a compact, egg-shaped head. Spikes have staminate flowers at the base and pistillate flowers above. The pistillate scales are chestnut brown with a greenish midrib and conceal the developing perigynia. The copper-colored perigynia are 3-5 mm long and broadly lance-shaped with evident winged margins. The perigynia spread away from the axis of the spike at maturity, exposing the poorly-defined beak. The achene is 2-sided in cross section.

Thick-headed sedge is common and widespread, although usually not dominant, in moist, open habitats from the valley to near timberline. AK to CA, east to Alta., W. MT, and N. WY.

This species is very similar to C. microptera, but it usually does not form large bunches, and the perigynia are less flattened than in the latter.

18. Carex athrostachya Olney

Slender-beaked Sedge

This species is densely tufted, without rhizomes, and has stems, 20-60 cm (8-24 in) tall, with the lowest leaves reduced to scales. The flat leaves are 1-4 mm wide and usually shorter than the stems. The several sessile spikes are closely congested in a straw-colored or light brown, egg-shaped head that is subtended by a narrow, leaflike bract longer than the inflorescence. The spikes have staminate flowers at the base and pistillate flowers above. Pistillate scales are smaller than the perigynia and are brownish-translucent with a firm midrib extending into a short point. The pale green or light brown perigynia are 3-5 mm long, narrowly lance-shaped, flattened, and wing-margined. The achene is 2-sided in cross section.

Slender-beaked sedge is locally abundant in wet meadows, along small streams, and on gravelly shores from the valley to the lower subalpine zone. AK to CA, east to Sask., ND, and CO.

The narrow perigynia and long, narrow bract below the clustered inflorescence are good field characters.

19. Carex scopulorum Holm

Rocky Mountain Sedge

This sod-forming sedge has scattered or loosely clustered stems, 10-40 cm (5-16 in) tall, from stout, branching rhizomes. The flat leaves are 2-6 mm wide and shorter than the stems. The black or purplish inflorescence is subtended by a short, leaflike bract and consists of 3-6 erect, well-separated, cylindrical spikes. The terminal spike is usually staminate (sometimes with both male and female flowers), while the lower are pistillate. The lowest pistillate spike may have a short stalk. The pistillate scales are papery and black or dark purple. The egg-shaped perigynia are 2-3 mm long and pale green or tan with purple spots. The achene is 2-sided in cross section.

Rocky Mountain sedge is absent or uncommon at lower elevations but is locally abundant in many subalpine, wet meadows. B.C. to CA, east to Alta., MT, and CO.

20. Carex bebbii Olney

Bebb's Sedge

This species has stems, 20-80 cm (8-32 in) tall, and forms dense tufts without rhizomes. The flat leaves are 2-4 mm wide and nearly as tall as the stems. The 4-12 sessile spikes are closely aggregated into a pale green or light brown, egg-shaped or cylindrical head. Each nearly round spike has the staminate flowers at the base and pistillate flowers above. The thin, papery, pistillate scales are light brown with a green midrib and are shorter than the perigynia. The dull green or brownish perigynia are 4-6 mm long and lance-shaped, usually with a poorly-defined beak. The achene is triangular or round in cross section.

Bebb's sedge occurs in moist meadows in the valley and montane zones and is locally abundant along the Bitterroot River. B.C. and WA, east to Newf., NJ, IL, SD, and CO.



p. *Carex athrostachya* q. *C. pachystachya* r. *C. nebrascensis*

21. Carex aurea Nutt.

Golden Sedge

This small sedge has slender stems, 3-20 cm (1-8 in) tall, arising singly or in small clumps from slender, creeping rhizomes. The flat leaves are 1-4 mm wide and often taller than the stems. The inflorescence consists of a narrow, terminal staminate spike and 1-several, widely separated, pistillate spikes borne on slender, erect or arching stalks, each subtended by a long, leaflike bract. There are sometimes 1-2 pistillate spikes borne at the base of the stem. Small plants may have greatly reduced bracts. The pistillate spikes consist of numerous, well-separated, round or egg-shaped perigynia, each subtended by a small, deciduous, straw-colored or brownish scale. The beakless perigynia are 2-3 mm long, whitish-green when young, and golden-brown at maturity. The achene is usually triangular in cross section.

Golden sedge is common in moist meadows from the valley to lower subalpine areas. It is an inconspicuous plant and easily overlooked when hidden by taller vegetation. AK to CA, east to Newf., PA, NE, and NM.

The nearly round, golden perigynia are unique.

22. Carex canescens L.

Gray Sedge

Gray sedge is 10-50 cm (4-20 in) tall and forms small to large clumps from short rhizomes. The soft, flat leaves are 1-4 mm wide, waxy green, and clustered near the base. The 4-8 small, sessile spikes are borne in an open, spikelike inflorescence, often subtended by a narrow, leaflike bract. The silvery-green to pale brown spikes have staminate flowers at the base and pistillate flowers above. The pistillate scales are pale and thin except for the firmer, greenish midvein. The greenish or light brown perigynia are 2-3 mm long, slightly convex, and elliptical with a short beak. The achene is 2-sided in cross section.

This species occurs in wet habitats from the valley to near timberline but is most common in acid or calcareous bogs and on lake shores. Circumboreal, south in North America to VA, AZ, and CA.

23. Carex interior Bailey

Inland Sedge

The inland sedge has erect or spreading stems that are 20-50 cm (8-20 in) tall and forms clumps from fibrous roots. The long, flat leaves are 1-2 mm wide and occur mainly at the base of the plant. The 3-6 small, sessile spikes form a loosely clustered, narrow inflorescence. The terminal spike and usually some of the lower ones have staminate flowers below and 5-15 pistillate flowers above. Other spikes are wholly pistillate. Pistillate scales are straw-colored with broad translucent margins. The greenish or light brown perigynia are mostly 2-3 mm long and pear-shaped with a distinct beak. They become nearly perpendicular to the axis of the spike at maturity. The achene is 2-sided in cross section.

Locally common from the valley to the subalpine zone in bogs and other habitats with wet, organic soil. B.C. to Mex., east to Newf., PA, IN, and KS.

23. Carex tenera Dewey

Slender Sedge

This densely tufted sedge has slender, wiry stems, 20-60 cm (8-24 in) tall, that are much longer than the flat leaves. The slightly nodding inflorescence is dull brown and consists of 4-6 well-separated spikes. Each spike has staminate flowers at the base and pistillate flowers above. The pistillate scales are smaller than the perigynia and are thin and green or light brown with a greenish midrib. The green or straw-colored perigynia are pear-shaped and usually 3-4 mm long. The achene is 2-sided in cross section.

In our area, slender sedge has been collected only in moist meadows along the lower Bitterroot River. Alta. to WY, east to Que. and OK.

This plant similar to the more common C. bebbii, but can usually be distinguished by the more widely separated spikes.

24. Carex muricata L.

Muricate Sedge

Muricate sedge is densely tufted with slender, erect stems, 15-60 cm (6-24 in) tall, and flat leaves 1-2 mm wide. The part of the leaf that sheaths the stem is often dotted with red. The 2-5 small, sessile spikes are somewhat separated in the narrow, yellowish or tan-colored inflorescence. The terminal spike and usually some of the lower ones have staminate flowers below and 5-15 pistillate flowers above. Other spikes are wholly pistillate. The pistillate scales are yellowish with a green midvein. The yellowish-brown perigynia are 3-4 mm long and narrowly lance-shaped with a prominent beak. The achene is 2-sided in cross section.

The species is locally common in wet meadows and swamps in the valley and montane zones. Circumboreal, south in North America to NC, WI, CO, and CA.

25. Carex praticola Rydb.

Meadow Sedge

Plants of meadow sedge form small clumps with stems up to 60 cm (24 in) tall. The flat leaves are 2-4 mm wide and distributed on the lower part of the stem but are not basally clustered. The slender, arching inflorescence consists of 3-7 loosely aggregated spikes. Each spike has staminate flowers at the base and pistillate flowers above. The pistillate scales conceal the perigynia and are dull reddish brown or straw-colored with broad translucent margins and a pale center. The greenish to brown perigynia are 4-6 mm long and lance-shaped with a tapered beak and winged margins. The achene is 2-sided in cross section.



s. *Carex scopulorum* t. *C. bebbii* u. *C. aurea* v. *C. canescens*

In our area, this species is sparsely distributed in moist, open habitats at low and moderate elevations. AK to CA, east to Greenl., ND, and CO.

26. Carex brevior (Dewey) Mack.

Short-beaked Sedge

This species forms dense tufts with stems, 30-70 cm (12-28 in) tall, that have the lowest leaves reduced to scales. The coarse, flat leaves are 2-4 mm wide and shorter than the stems. The 3-8 sessile spikes are loosely aggregated into a somewhat elongated cluster. Each spike has staminate flowers at the base and pistillate flowers above. The yellowish-brown pistillate scales have a translucent margin and a green midrib and are smaller than the perigynia. The green or tan perigynia are 3-5 mm long, wing-margined, and nearly round in outline with a distinct beak. The achene is 2-sided in cross section.

Short-beaked sedge has been collected in moist meadows along the Bitterroot River south of Lolo. B.C. to OR, east to Que. and FL.

This species can be separated from the closely related C. bebbii by the more compact inflorescence and nearly orbicular perigynia.

27. Carex oederi Retz.

Green Sedge

[C. viridula Michx.]

Green sedge forms small clumps with fibrous roots and has stems 15-30 cm (6-12 in) tall. The flat or channeled leaves are 1-3 mm wide and often as tall or taller than the stems. The inflorescence consists of a terminal, staminate spike and 2-4 short, spreading pistillate spikes below, the upper ones aggregated and the lower ones each subtended by a long leaflike bract. The light brown or straw-colored pistillate scales have a whitish margin and greenish midvein and are smaller than the perigynia. The pale green or straw-colored perigynia spread outward from the axis of the spike at maturity and are about 2-3 mm long, and elliptical in outline with a distinct beak and nerved faces. The achene is triangular in cross section.

Infrequent in wet, marly or gravelly soil in the upper valley of Lolo Creek. Circumboreal, south in North America to CA, NM, IN, and NJ.

See note under C. flava (No. 41).

28. Carex crawfordii Fern.

Crawford's Sedge

This densely tufted species has fibrous roots and numerous stems, 20-60 cm (8-24 in) tall, with lowest leaves reduced to scales. The leaves are 1-3 mm wide, flat or channeled, and shorter than the stems. The 3-12 sessile spikes are aggregated into an oblong head up to 3 cm long that is subtended by a narrow, leafy bract. Each pale green or straw-colored spike has staminate flowers at the base and pistillate flowers above. The light brown pistillate scales have a greenish midvein and are shorter than the perigynia. The pale green or straw-colored perigynia are 3-4 mm long and narrowly lance-shaped, tapering to an indistinct beak. The achene is 2-sided in cross section.

Infrequent in our area, occurring near sloughs of the Bitterroot River west of Missoula. B.C. and WA, east to Newf. and NJ.

29. Carex buxbaumii Wahl.

Buxbaum's Sedge

Buxbaum's sedge is a rhizomatous species with stems, 25-80 cm (10-32 in) tall, that have the lowest leaves reduced to scales. The bluish-waxy leaves are 2-4 mm wide and often have rolled margins. The leaf sheaths are yellowish brown and dotted with red. The open inflorescence has a long leaflike bract at the base and consists of 2-5 spikes, the upper sessile and the lower with short stalks. The terminal spike has staminate flowers at the base, while the lower ones are entirely pistillate. The pistillate scales are dark brown or purplish-black and are tapered to a needlelike awn at the tip. The grayish-green perigynia are about 3-4 mm long and elliptical in outline, often with a minute beak. The achene is triangular in cross section.

This conspicuous plant has been collected in wet meadows in the Bitterroot Valley south of Lolo and between Hamilton and Darby. Circumboreal, south in North America to CA, CO, AK, and NC.

30. Carex vulpinoidea Michx.

Fox Sedge

Fox sedge has clustered stems, 30-80 cm (12-32 in) tall, from short rootstocks. The flat leaves are 2-5 mm wide, often longer than the stems, and have cross ribs on the sheaths opposite the blade. The numerous small spikes are aggregated into clusters in an elongated greenish-yellow to light brown inflorescence with narrow, leaflike bracts subtending each cluster. Spikes have staminate flowers at the tip and pistillate flowers below. The slender pistillate scales are greenish or straw-colored with a greenish midvein protruding into a small, pointed tip. The yellowish-green or straw-colored perigynia are 2-4 mm long and egg-shaped, tapering to an indistinct beak. The achene is 2-sided in cross section.

Collected in wet meadows along the Bitterroot River south of Lolo. B.C. to OR, east to Newf. and FL.



w. *Carex interior* x. *C. tenera* y. *C. muricata* z. *C. praticola* a. *C. brevior*



b. *Carex crawfordii* c. *C. buxbaumii* d. *C. oederi*

31. Carex scoparia Schkuhr.

Pointed-broom Sedge

Pointed-broom sedge is a tufted species having numerous stems, 30-80 cm (12-32 in) tall, with the lowest leaves reduced to scales. The flat leaves, 1-3 mm wide, are restricted to the lower part of the stem but not clumped. The 3-8 sessile spikes are loosely aggregated in a spikelike, pale green to tan inflorescence. Spikes have staminate flowers at the base and pistillate flowers above. The narrow, light brown pistillate scales are pointed at the tip and have a green midvein and pale, papery margins. The greenish or straw-colored perigynia are 4-6 mm long and lance-shaped with winged margins. The achene is 2-sided in cross section.

This rare sedge has been collected in the lower Bitterroot Valley. B.C. to OR, east to Newf. and FL.

Group V. This group contains species typically occurring on the margins of standing or flowing bodies of water in the valleys and lower elevations in the mountains.

32. Carex arcta Boott

Clustered Sedge

Clustered sedge is a densely tufted species with sharply triangular stems 25-60 cm (10-24 in) tall. The long, flat leaves are 1-4 mm wide and often as tall as the stems. The lower leaf sheaths are dotted with purple opposite the blade. All but the lowest of the 6-15 sessile spikes are closely aggregated into a pale to brownish green, oblong head. Spikes have staminate flowers at the base and pistillate flowers above. The pale, translucent pistillate scales have a dark midvein and are shorter than the perigynia. The dull green to brownish perigynia are about 2-3 mm long and lance-shaped with an indistinct beak. The achene is 2-sided in cross section.

Locally abundant, especially along the east front of the Bitterroot Mountains. Yuk. to CA, east to Que., MN, and MT.

33. Carex rostrata Stokes
[C. utriculata Boott]

Beaked Sedge

Beaked sedge is a coarse plant with stems, 40-100 cm (16-40 in) tall, that arise singly or in dense tussocks from deep rhizomes. The flat leaves are 4-12 mm wide and often surpass the inflorescence. The lower part of the leaf that sheaths the stem is brownish above and reddish-purple at the base. The long, open inflorescence consists of 2-4 narrow, staminate spikes above the 2-5 well-separated, short-stalked or sessile pistillate spikes. The light brown pistillate spikes are 2-7 cm long and subtended by long, narrow, leaflike bracts. The brown, pistillate scales have translucent margins and a pale center and are smaller than the perigynia. The shining pale green to light brown perigynia are 4-7 mm long, inflated, and egg-shaped with a prominent, 2-lobed beak. They spread at right angles to the axis of the spike at maturity. The achene is triangular in cross section.

This common sedge often dominates large areas of wet meadows and marshes in the valley up to the lower subalpine. Circumboreal, south in North America to CA, NM, IN, and DE.

The large pistillate spikes resemble a small-bristled bottle brush.

34. Carex vesicaria L.
[C. exsiccata Bailey]

Inflated Sedge

The stems of inflated sedge are 30-100 cm (12-40 in) tall and scattered to loosely clustered on deep rhizomes. The flat leaves, 3-8 mm wide, have reddish basal sheaths and are often taller than the stems. The inflorescence consists of 2-4 narrow, staminate spikes above the 2-5 well-separated, short-stalked or sessile pistillate spikes. The light brown pistillate spikes are 2-7 cm long and subtended by long, narrow, leaflike bracts. The light brown, papery pistillate scales are pointed and smaller than the perigynia. The pale green to brown, inflated perigynia, 5-11 mm long, are lance-shaped and gradually taper into the long beak. They are held at an ascending angle to the axis of the spike. The achene is triangular in cross section.

Locally common in wet meadows, marshes, and lake shores from the valley to near timberline. Circumboreal, south in North America to CA, NM, MO, and DE.

This sedge resembles and is often associated with C. rostrata, but can be distinguished by the more erect perigynia and the more gradually tapered perigynium beak.

35. Carex retrorsa Schwein.

Retrorse Sedge

This species has stems, 30-100 cm (12-40 in) tall, clustered on short rhizomes. The flat leaves are 4-10 mm wide and often longer than the stems. The inflorescence is a close cluster of 1-few staminate or partly staminate spikes and 2-5 usually sessile pistillate spikes, 2-5 cm long, each subtended by a narrow, leaflike bract greatly exceeding the inflorescence. The pistillate scales are inconspicuous. The crowded, shining, light-colored perigynia are 7-10 mm long, inflated, and elliptical in outline with a long, 2-lobed beak. They are widely spreading or even reflexed from the axis of the spike. The achene is triangular in cross section.

Retrorse sedge is locally common in wet meadows in the valleys. It occurs in the shade of willows and alders along the Bitterroot River south of Lolo. B.C. to OR, east to Newf., NJ, IL, and CO.



e. *Carex vulpinoidea* f. *C. scoparia* g. *C. arcta*



h. *Carex rostrata* i. *C. vesicaria* j. *C. retrorsa*

36. Carex atherodes Spreng

Awned Sedge

Awned sedge is 40-150 cm (16-60 in) tall with stems that are often purple at the base arising singly or loosely clustered from long, deep-seated rhizomes. The flat leaves often exceed the inflorescence and are 4-10 mm wide with densely hairy sheaths surrounding the stem. The long, open inflorescence consists of 1-few narrow, staminate spikes (often with a few pistillate flowers) above 2-5 sessile or stalked pistillate spikes, 2-10 cm long, each subtended by a narrow, leaflike bract longer than the inflorescence. The dark, pistillate scales are narrow with a long awn at the tip. The pale green or straw-colored perigynia are 7-10 mm long, inflated, and elliptical with a well-developed beak having widely-spreading lobes at the tip. They are held at an ascending angle to the axis of the spike. The achene is triangular in cross section.

Infrequent in sloughs of the Bitterroot River between Lolo and Stevensville. Circumboreal, south in North America to NY, MO, CO, and OR.

Awned sedge can often be found in deeper water than our other, coarse marsh sedges. The awned pistillate scales are a good diagnostic character for fruiting specimens; however, this species is often encountered in sterile condition, and then the large size with hairy leaf sheaths is distinctive.

37. Carex lanuginosa Michx.

Woolly Sedge

This rhizomatous species has stiff, erect stems, 30-120 cm (12-48 in) tall, with purple spots and leaves reduced to scales at the base. The dull green leaves are flat, 1-2 mm wide, and folded along the midrib. The narrow, open inflorescence consists of 2 staminate spikes above 2-3 widely-separated, short-stalked, erect, pistillate spikes, each subtended by a long, narrow, leaflike bracts. The reddish-brown pistillate scales have a pale midvein and are smaller than the perigynia. The velvety-hairy, brownish-green perigynia are about 3-4 mm long and egg-shaped in outline with a short, 2-lobed beak. The achene is triangular in cross section.

Woolly sedge is common and locally abundant in wet meadows and marshes in the valley and montane zones. B.C. to CA, east to Que., TN, and TX.

Very similar to C. lasiocarpa, but the latter has much more tightly rolled leaves and usually occurs in more boggy habitats.

38. Carex lasiocarpa Ehrh.

Slender Sedge

This species is very similar to C. lanuginosa (No. 37, above) but can be distinguished by having leaves that are tightly rolled and round in cross section. The perigynia of slender sedge are more elliptical in outline than those of C. lanuginosa.

Uncommon in boggy habitats in the valley and montane zones. Circumboreal, south in North America to WA, ID, MT, IA, PA, and Newf.

39. Carex lenticularis Michx.

Kellogg's Sedge

[C. kelloggii Boott]

Kellogg's sedge forms dense clumps with fibrous roots and often arching stems, 15-70 cm (6-28 in) tall, that are brown at the base. The flat leaves are 2-4 mm wide and often have a slightly bluish cast. The loosely aggregated inflorescence is subtended by a narrow, leaflike bract and consists of a terminal staminate spike and 2-5 sessile or short-stalked, cylindrical, pistillate spikes. The dark brown or black, pistillate scales are smaller than the perigynia and have a green midvein and narrow, whitish margins. The light green perigynia are 2-3 mm long and egg-shaped or broadly lance-shaped with an indistinct beak and nerves on the face. The achene is 2-sided in cross section.

One of our most common sedges, occurring in many wet, open habitats from river floodplains to the subalpine zone. AK to CA, east to Lab., MA, and CO.

40. Carex stipata Muhl.

Sawbeak Sedge

This coarse sedge is 35-100 cm (14-40 in) tall and forms dense bunches from short or elongated rootstocks. The flat leaves are up to 11 mm wide and are cross-corrugated where they sheath the stem opposite the blade. The numerous, small spikes are closely aggregated in a short-branched, lance-shaped inflorescence, subtended by a small, narrow bract. Each spike has staminate flowers at the tip and pistillate flowers below. The papery, pale brown pistillate scales are smaller than the perigynia and have a green midvein and a pointed tip. The greenish or light brown perigynia are 4-8 mm long and lance-shaped with a long tapered beak and nerved faces. The achene is triangular in cross section.

Sawbeak sedge is common in many wet, open habitats in the river valleys. AK to CA, east to Newf., FL, and TX.

41. Carex flava L.

Yellow Sedge

Yellow sedge forms dense clumps with fibrous roots and stems 20-80 cm (4-32 in) tall. The flat leaves, 2-6 mm wide, are basal as well as on the stem. The inflorescence consists of a terminal, staminate spike and 2-5 short pistillate spikes, the upper sessile and aggregated, the lower one(s) widely separated, short-stalked, and subtended by a very long, narrow, leaflike bract. The light brown, pistillate scales are



k. *Carex atherodes* l. *C. lanuginosa*



m. *Carex lasiocarpa* n. *C. lenticularis* o. *C. stipata*

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smaller than the perigynia and have a greenish midvein and whitish, translucent margins. The green or yellowish perigynia are about 4-6 mm long and pear-shaped with a long, downward-curved beak. The perigynia spread at right angles to the axis of the spike. The achene is triangular in cross section.

Infrequent in wet meadows and along shores and banks. Circumboreal, south in North America to B.C., MT, IN, and NJ.

This plant is very similar to *C. oederi* but is larger in most characters.

42. *Carex cusickii* Mack.

Cusick's Sedge

This clump-forming sedge has short rhizomes and densely clustered stems, 30-80 cm (12-32 in) tall, that arch outward at maturity. Lower leaves are reduced to scales. The flat leaves are 3-5 mm wide and conspicuously red-dotted and copper-colored where they sheath the stem. The numerous, small spikes are densely clustered on the short, loosely aggregated branches of the inflorescence. Each spike has staminate flowers at the tip and pistillate flowers below. The brown pistillate scales conceal the perigynia and are sharp-pointed with a pale midvein and margins. The glossy, dark brown perigynia are about 2-4 mm long and lance-shaped, gradually tapering to the indistinct, finely toothed beak. The achene is 2-sided in cross section.

Cusick's sedge is locally common in marshes, bogs, and wet meadows from the valley to the subalpine zone. B.C. to CA, east to MT and UT.

See *C. diandra* (No.43) below.

43. *Carex diandra* Schrank

Lesser Panicked Sedge

Lesser panicked sedge is very similar to *C. cusickii* (No.42) but is a more slender plant, usually with narrower leaves, 1-3 mm wide, and sheaths that are red spotted but lack the coppery color. The inflorescence is narrower than in *C. cusickii*, with shorter branches below. The pistillate scales and perigynia are similar in the two species.

This uncommon species has been found along a slough of the Bitterroot River north of Florence and near the crest of the Sapphire Range east of Hamilton. Circumboreal, south in North America to CA, CO, IA, NE, and PA.

44. *Carex aperta* Boott

Columbia Sedge

This sedge forms loose or dense clumps from short rhizomes and has stems 20-80 cm (8-32 in) tall. The flat leaves are 2-6 mm wide and shorter than the stems. The open inflorescence is subtended by a leaflike bract and consists of a narrow, terminal, staminate spike and 2-3 well-separated pistillate spikes borne on short, erect or slightly arching stalks. The brown or purplish-black, pistillate scales can have a pale midvein and are narrower than the perigynia. The inflated, copper-colored perigynia are 2-3 mm long and elliptical with a short, indistinct beak. The achene is 2-sided in cross section.

Columbia sedge is uncommon in our area, occurring in wet, open habitats, often along streams, in the valleys and foothills. B.C. to OR, east to ID and MT.

Group VI. Members of this group occur in moist to wet meadows and on the margins of bodies of water and water courses in the montane and lower subalpine zones.

45. *Carex mertensii* Prescott

Mertens' Sedge

Mertens' sedge is a rhizomatous species up to 100 cm (40 in) tall with small clumps of stems that have the lower leaves reduced to scales. The flat leaves are often longer than the stems and are 3-10 mm wide with inrolled margins. The open inflorescence consists of 6-10 cylindrical spikes, 2-4 cm long, that are borne on long arching stalks, the lower subtended by long, leaflike bracts. The uppermost spike (and sometimes the lower ones) has staminate flowers at the base, while the lower ones are usually entirely pistillate. The dark brown or purple pistillate scales have a pale midvein and are shorter than the perigynia. The flattened, pale brown perigynia are 4-6 mm long and oval in outline, without a beak. The achene is triangular in cross section.

A showy species, common along ditches and small streams at lower elevations in the mountains. AK to CA, east to MT and ID.

46. *Carex luzulina* Olney

Woodrush Sedge

[*C. l.* var. *ablata* (Bailey) Herm.]

Woodrush sedge forms small clumps from slender rootstocks and has erect stems 15-50 cm (6-20 in) tall. The firm, flat leaves are 3-9 mm wide and usually much shorter than the stems. The open inflorescence is composed of a terminal staminate spike and 3-5 well-separated, linear-oblong, pistillate spikes, the lower ones on stalks and subtended by leaflike bracts. The dark brown or blackish, pistillate scales are shorter than the perigynia and have a pale midvein and translucent margins. The light green perigynia are tinged with black, 3-5 mm long, and narrowly lance-shaped with an indistinct beak. The achene is triangular in cross section.



p. *Carex flava* q. *C. cusickii* r. *C. diandra*



s. *Carex aperta* t. *C. mertensii* u. *C. luzulina*

This species does not grow in perennially wet habitats but is common in vernal moist meadows in the Bitterroot Mountains. B.C. to CA, east to MT, WY, and UT.

47. *Carex atrata* L.

Blackened Sedge

[*C. atosquama* Mack., *C. epapillosa* Mack., *C. heteroneura* var. *e.* (Mack.) Herm.]

This tufted species has fibrous roots with stems, 15-50 cm (6-20 in) tall, that are reddish and darkened at the base with the lower leaves reduced to scales. The flat leaves are 2-7 mm wide and shorter than the stems. The inflorescence consists of 2-5 spikes in a loosely aggregated cluster, the upper sessile and the lower erect on short stalks and subtended by narrow, leaflike bracts. The terminal spike has stamens at the tip and pistillate flowers below, while the lower spikes are pistillate, sometimes with a few staminate flowers at the base. The dark brown or black, pistillate scales have a lighter midvein and are shorter than the perigynia. The olive green or straw-colored perigynia are 3-4 mm long and elliptical or oblong with a short beak. The achene is triangular in cross section.

Var. *erecta* Boott has egg-shaped or elliptical perigynia and is common in moist, subalpine meadows of the Sapphire Range and infrequent near timberline in the Bitterroot Mountains. Var. *atosquama* (Mack.) Cronq., which has narrowly elliptical or lance-shaped perigynia, was collected once in the Sapphire Range. The range of the species as a whole is circumboreal, south in North America to CA, AZ, CO, MI, and VT.

See comments under *C. albonigra* (No. 73).

48. *Carex aquatilis* L.

Water Sedge

Water sedge has stems, 25-70 cm (10-28 in) tall, that are reddish-purple at the base and form small tufts or large clumps from strong, deep-seated rhizomes. The flat leaves are 2-7 mm wide with sheaths that are purple dotted and easily ruptured. The narrow, open inflorescence consists of a terminal staminate spike and 2-6 elongated, pistillate (occasionally some staminate flowers at the tip) spikes, the lower ones well-separated, borne on short stalks and subtended by narrow, leaflike bracts. The black, pistillate scales have a pale midvein and narrow, translucent margins. The numerous, light green or straw-colored perigynia are flattened, 2-3 mm long, and elliptical with a short beak. The achene is 2-sided in cross section.

Very common in shallow water of marshes and shores from the valley up to timberline. Circumboreal, south in North America to CA, NM, NE, and NJ.

This species is similar to *C. scopulorum*, and *C. prionophylla*, and a technical key should be consulted to separate them. *C. aquatilis* is extremely variable; Hermann (1970) recognizes three varieties in our area.

49. *Carex prionophylla* Holm

Saw-leaved Sedge

[*C. scopulorum* var. *prionophylla* (Holm) Standley]

This densely tufted sedge has short rhizomes and stems, 30-80 cm (12-32 in) tall, that are reddish-brown at the base with the lower leaves reduced to scales. The flat leaves are 2-5 mm long and shorter than the stems. The narrow, open inflorescence is subtended by a narrow, leaflike bract and consists of a terminal staminate spike and 2-6 elongated, pistillate (occasionally some staminate flowers at the tip) spikes, the lower ones well separated and borne on stalks. The papery, black, pistillate scales often have a pale midvein. The pale green to dark tan perigynia are 2-4 mm long and egg-shaped with a short beak. The achene is 2-sided in cross section.

Saw-leaved sedge is infrequent in wet meadows at moderate elevations in both the Bitterroot and Sapphire ranges. Eastern WA, ID, and W. MT.

This sedge is very similar to *C. scopulorum* and *C. aquatilis*. The technical key should be consulted in order to separate them.

50. *Carex spectabilis* Dewey

Showy Sedge

Showy sedge is a tufted species, 20-80 cm (8-32 in) tall, with short rhizomes. The flat leaves are 2-7 mm wide with slightly rolled margins and yellowish-brown and reddish-spotted sheaths. The open inflorescence consists of 1-2 terminal, staminate spikes and 2-6 well-separated, pistillate spikes, the lower ones borne on nodding or arching stalks and subtended by leaflike bracts. The black pistillate scales have a pale midvein. The pale green to dark perigynia are 3-5 mm long and elliptical with a short beak. The achene is triangular in cross section.

Locally common along small, subalpine streams in the Sapphire Range but is absent from the granitic Bitterroot Mountains. AK to CA, east to Alta., ID, and MT.

The nodding, black spikes and subalpine habitat are distinctive.

51. *Carex illota* Bailey

Small-headed Sedge

This sedge is tufted with short, creeping rootstocks and erect stems 10-30 cm (4-12 in) tall. The flat or sometimes channeled leaves are 1-3 mm wide, shorter than the stems, and clustered at the base of the plant. The leaf sheaths are yellow- or brownish-tinged. The 3-6 small spikes are closely aggregated into a dark brown, compact head. The spikes have staminate flowers at the base and pistillate flowers



v. *Carex atrata* w. *C. aquatilis* x. *C. prionophylla*

above. The dark brown pistillate scales are thin and shiny. The greenish or brown perigynia are 2-3 mm long and lance-shaped with a distinct beak. The achene is 2-sided in cross section.

Small-headed sedge is locally common in mudflats around subalpine lakes in the Bitterroot Mountains, and in subalpine meadows in the Sapphire Range. B.C. to CA, east to MT, WY, and CO.

See comments under *C. limnophila* (No.52).

52. *Carex limnophila* Herm.

Pond Sedge

Pond sedge is very similar to *C. illota* in most characters; however, the former has perigynia with toothed and winged margins, while the perigynia of the latter are smooth and without winged margins.

It has been collected at elevations of about 2900 m (9,500 ft) on Trapper and Chaffin peaks in the Bitterroot Mountains and in subalpine meadows in the Sapphire and Rattlesnake Mountains. WA to NV, east to Alta. and CO.

53. *Carex leporinella* Mack.

Sierra-hare Sedge

This densely tufted species with fibrous roots, often forms large clumps. The stems are 10-30 cm (4-12 in) tall with the lowest leaves reduced to scales. Leaves are flat or channeled and 1-2 mm wide. The 3-6 sessile spikes are closely aggregated into an elongated cluster colored pecan-shell brown. The spikes have staminate flowers at the base and pistillate flowers above. The brown pistillate scales have conspicuous, pale, translucent margins. The brownish perigynia are 3-4 mm long and narrowly elliptical with an ill-defined beak. The achene is 2-sided in cross section.

This sedge occurs in subalpine meadows of the Sapphire and Rattlesnake ranges at 1830-2290 m (6,000-7,500 ft) but has been collected only once in the Bitterroot Range, near the Selway Divide southwest of Hamilton. WA to CA, east to central ID and w. MT.

54. *Carex raynoldsii* Dewey

Raynolds' Sedge

Raynolds' sedge is a loosely tufted species with short rhizomes and erect stems, 20-70 cm (8-28 in) tall, that are reddish at the base. The flat leaves are 2-7 mm wide and may be as long as the stems. The inflorescence is subtended by a long leaflike bract and consists of a terminal staminate spike above 2-5 erect, pistillate spikes, the upper sessile and the lower on short or sometimes long stalks. The black, pistillate scales are sharp-pointed and smaller than the perigynia. The pale green or yellowish perigynia are about 3-4 mm long and elliptical with a short beak. The achene is triangular in cross section.

Common in subalpine meadows in the Sapphire Range but not known from the Bitterroot Mountains. B.C. to CA, east to Alta., MT, WY, and CO.

55. *Carex norvegica* Retz.

Norway Sedge

[*C. media* R.Br.]

This sedge has slender, branched rhizomes and forms loose to dense tufts with ascending stems that are 10-50 cm (4-20 in) tall. The flat leaves are 1-3 mm wide and shorter than the stems. The loosely clustered inflorescence is subtended by a small, leaflike bract and consists of a terminal spike with staminate flowers at the base and pistillate flowers above and 2-4 sessile or short-stalked, pistillate spikes below. The small, black, pistillate scales have a lighter midvein and pale, translucent margins. The light green to dark purple perigynia are 2-3 mm long and elliptical in outline with a small beak. The achene is triangular in cross section.

Norway sedge is infrequent in moist, often partially shaded microhabitats of subalpine meadows in the Sapphire Range. It has not been found in the Bitterroot Mountains. Circumboreal, south in North America to B.C., UT, NM, WI, and Que.

56. *Carex limosa* L.

Mud Sedge

This small, rhizomatous sedge has stems, 20-35 cm (8-14 in) tall, that arise singly or in small clusters and are reddish brown at the base with the lowest leaves reduced to scales. The few, deeply channeled leaves are 1-2 mm wide and much shorter than the stems. The open inflorescence consists of a narrow, erect, staminate spike above 1-3 widely separated, pistillate (often a few staminate flowers at the tip) spikes borne on long arching stalks and subtended by narrow, leaflike bracts not surpassing the inflorescence. The reddish or grayish-brown pistillate scales have a green midvein and are large enough to conceal the perigynia. The pale green or straw-colored perigynia are 2-4 mm long and elliptical with a short beak and nerved faces. The achene is triangular in cross section.

In our area, mud sedge is always found associated with *Sphagnum* moss in bogs and wet meadows at elevations of 1675-2225 m (5,500-7,300 ft). Circumboreal, south in North America to CA, NV, UT, and WY.

See *C. paupercula* (No.57)

57. *Carex paupercula* Michx.

Poor Sedge

Poor sedge is very similar to the more common *C. limosa*, and both species occur in *Sphagnum* bogs. *C. paupercula* can be distinguished by having flat leaves that are not replaced by scales at the base of the stem. In addition, the leafy bract subtending the lowest spike is usually longer than the inflorescence.



y. *Carex spectabilis* z. *C. illota* a. *C. limnophila*



b. *Carex leporinella* c. *C. raynoldsii* d. *C. norvegica* e. *C. limosa*

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The pistillate spikes of C. paupercula often have a few staminate flowers at the base rather than the tip, and the scales are tapered to a long pointed tip.

This rare species has been collected from 2 bogs in the Rattlesnake Mountains north of Missoula. Circumboreal, south in North America to WA, UT, and CO.

58. Carex dioica L.
[C. gynocrates Wormsk.]

Small Bog Sedge

Small bog sedge is a slenderly rhizomatous species with solitary stems up to 20 cm (8 in) tall. The leaves, less than 1 mm wide, are crowded at the base of the plant and shorter than the stems. Stems are terminated by a solitary spike with the slender, staminate portion above the pistillate flowers (occasionally the spikes are all staminate or pistillate). The papery, light brown, pistillate scales are shorter and broader than the perigynia. The shiny, chestnut-brown perigynia are 3-4 mm long and lance-shaped with a down-curved beak. They spread at right angles to the stem at maturity. The achene is 2-sided in cross section.

This small sedge is locally common in wet or mossy soil of near-neutral or slightly alkaline meadows or in partial shade at the edge of spruce forests in subalpine areas of the Sapphire Range. It is not known from the Bitterroot Mountains. Circumboreal, south in North America to B.C., ne. OR, NV, UT, CO, MI, and PA.

59. Carex praeceptorum Mack.

Teacher's Sedge

This sedge has single or loosely tufted stems, 10-25 cm (4-10 in) tall, from short rhizomes. The leaves are 1-3 mm wide and shorter than the stems. The 4-5 sessile spikes are loosely aggregated in an open head. Each spike has staminate flowers at the base and about 15-25 pistillate flowers above. The brown, pistillate scales are papery with a firm, greenish midvein. The light brown perigynia are about 2-3 mm long and egg-shaped with a suture in the short beak that does not extend into the body. The achene is 2-sided in cross section.

Teacher's sedge occurs in wet, often mossy soil of subalpine meadows at 2130-2470 m (7,000-8,100 ft) in the Bitterroot and Sapphire ranges. It has been found above Carlton Lake southwest of Lolo and near Chaffin Lake southwest of Darby. WA to CA, east to MT, WY, and CO.

This species is similar to both C. canescens and C. brunnescens. It can be distinguished from the former by the brown rather than greenish spikes and from the latter by having more than 15 pistillate flowers per spike.

60. Carex brunnescens (Pers.) Poir.

Brownish Sedge

Brownish sedge forms small or large tufts without long rhizomes and has slender, lax stems 15-40 cm (6-16 in) tall. The flat leaves are 1-3 mm wide and mostly clustered near the base. The 4-9 sessile spikes are closely aggregated at the top and more widely separated below. Each spike has staminate flowers at the base and pistillate flowers above. The whitish, papery, pistillate scales have a green midvein and are shorter than the perigynia. The brown perigynia are about 2-3 mm long and egg-shaped with a suture that extends from the tip of the short beak into the body. The achene is 2-sided in cross section.

Collected twice in the Bitterroot Mountains, in wet meadows at 1645 m (5,400 ft) and 2285 m (7,500 ft). Circumboreal, south in North America to OR, UT, WY, TN, and VA.

This species is similar to both C. canescens and C. praeceptorum. See note under the latter (No.59).

61. Carex saxatilis L. var. major Olney

Russet Sedge

Russet sedge is rhizomatous with solitary or small clusters of stems, 20-45 cm (8-18 in) tall, that are reddish-tinged at the base. The erect or ascending leaves are 2-4 mm wide and flat with inrolled margins. The open inflorescence consists of a single (sometimes 2) narrow, terminal, staminate spike and 1-3 oblong-cylindrical, widely-separated, pistillate spikes, erect or arching on short stalks and subtended by a narrow, leaflike bract. The chestnut-colored, pistillate scales have a pale midvein and papery margins with a whitish tip and are smaller than the perigynia. The shining, greenish-yellow to reddish black perigynia are 3-5 mm long and egg-shaped with a small beak. The achene is triangular in cross section.

This uncommon sedge is capable of forming turf and is often associated with C. rostrata or C. vesicaria around high elevation lakes. It has been collected only once in the Bitterroot Mountains, but is more frequent in the Sapphire Range. Circumboreal, south in North America to WA, NV, UT, CO, and Lab.

Group VII. Sedges in this group occur in moist habitats in the upper subalpine and alpine zones such as cool, north- and east-facing slopes, seep areas, and depressions where snow lies late.

62. Carex nigricans C.A. Mey.

Black Alpine Sedge

A rhizomatous species, it has solitary or small tufts of stems, 10-25 cm (4-10 in) tall, with the lowest leaf blades reduced to scales. The stiff, flat leaves are 1-3 mm wide and clustered near the base



f. *Carex paupercula* g. *C. dioica* h. *C. praeceptorum* i. *C. saxatilis* j. *C. brunnescens*

of the plant. The solitary, terminal spike is elliptical with light brown, staminate flowers at the top and pistillate flowers below. The dark brown, pistillate scales are shorter than the perigynia and fall at maturity. The light brown perigynia are 3-5 mm long and narrowly lance-shaped with an ill-defined, dark beak. They become widely spreading or reflexed at maturity. The achene is triangular in cross-section.

Black alpine sedge is the most common and only sod-forming sedge above 2135 m (7,000 ft) in the high Bitterroot Mountains. It is abundant in moist or vernal moist meadows, late snowmelt depressions, and other habitats where moisture is plentiful. Western North America, AK south to CA, UT, and CO.

63. Carex paysonis Clokey

Payson's Sedge

Payson's sedge forms small tufts with stems, 10-25 cm (4-10 in) tall, from elongated rhizomes. The flat leaves are 2-8 mm wide with a slight bluish cast. The leaves are clustered toward the base of the plant and the old, gray or brown, fibrous leaf sheaths are persistent. The open inflorescence consists of 1-2 terminal staminate spikes above 2-4 oblong-cylindrical, erect, sessile or short-stalked pistillate spikes, the lower ones subtended by narrow, leaflike bracts. The dark, reddish-black pistillate scales have a thick, whitish midvein. The light green or purple-tinged perigynia are about 3-4 mm long and nearly round in outline with a short beak. The achene is triangular in cross section.

This common sedge tends to form large colonies on sandy or gravelly soils of banks and more open meadows in the subalpine and alpine zones. It is notably abundant at 2895-2995 m (9,500-9,800 ft) on Trapper Peak in the Bitterroot Mountains. B.C. and Alta., south to NV, UT, and WY.

64. Carex phaeocephala Piper

Dunhead Sedge

Dunhead sedge forms dense clumps with fibrous roots and stems, 5-35 cm (2-14 in) tall, with the lower leaves reduced to scales. The rolled or channeled leaves are about 1-2 mm wide, shorter than the stems, and clustered near the base of the plant. The 3-5 spikes are closely aggregated in a congested inflorescence. Each spike has staminate flowers at the base and pistillate flowers above. The brown or reddish-brown, pistillate scales usually have a green midvein and are slightly shorter than the perigynia. The straw-colored to dark brown perigynia are 4-6 mm long and narrowly lance-shaped with an indistinct beak and winged margins. The achene is 2-sided in cross section.

A common high-elevation species, it is most abundant on vernal moist slopes but also occurs on cool, north slopes and along the margins of windswept, rocky barrens. Alta. and B.C., south to CA and CO.

65. Carex pyrenaica Wahl.

Pyrenaean Sedge

This densely tufted sedge is 5-20 cm (2-8 in) tall with fibrous roots and leaves clustered at the base. The wiry leaves are flat or channeled and about 1 mm wide. The solitary spike has staminate flowers at the tip and pistillate flowers below. The dark brown or black, pistillate scales are shorter than the perigynia, and usually some have fallen off by the time the fruit has matured. The shiny, straw-colored to dark brown perigynia are 3-5 mm long and narrowly lance-shaped with an ill-defined beak. They are erect or ascending on the axis of the spike when mature. The achene is triangular in cross section.

Pyrenaean sedge is common in open soil of permanently moist slopes near or above timberline. It is frequently associated with Juncus drummondii and J. mertensianus. Interruptedly circumboreal, south in W. North America to OR, UT, and CO.

In many respects, this species is similar to C. nigricans, but can be distinguished by the non-rhizomatous habit and more erect perigynia. Putative hybrids with C. nigricans have been found on Johnson Peak se of Sula.

66. Carex haydeniana Olney

Hayden's Sedge

Hayden's sedge forms dense tufts with fibrous roots and erect stems 10-30 cm (4-12 in) tall. The flat leaves are 2-4 mm wide and shorter than the stems. The 4-7 sessile spikes are closely aggregated into a dark brown to greenish-black, globose head. Spikes have staminate flowers at the base and pistillate flowers above. The brown, pistillate scales are papery and shorter than the perigynia. The green or straw-colored perigynia are about 5-6 mm long and pear-shaped with a prominent beak and winged margins. The achene is 2-sided in cross section.

Occurs in small colonies in moist meadows throughout the Bitterroot Mountains at 2375-2835 m (7,800-9,300 ft). It is less common in the northern part of the range. B.C. to CA, east to Alta., WY, and CO.

Hayden's sedge is similar to C. microptera; however, the latter usually occurs at lower elevations, is larger in stature, and has smaller, narrower perigynia and lighter brown heads.

67. Carex scirpoidea Michx.

Single-spike Sedge

[C. pseudoscirpoidea Rydb., C. stenochlaena (Holm) Mack.]

The stiffly erect stems of single-spike sedge are 10-35 cm (4-14 in) tall and solitary or clustered from a reddish-brown rhizome. The base of the stem is reddish brown and beset with the dried leaf bases of the previous year. The flat or channeled leaves are 1-3 mm long and clustered near the base of the plant. The solitary spike is usually entirely pistillate or staminate. The spikes of both sexes are similar: cylindrical, about 1-4 cm long, and densely-flowered. The brown to dark, reddish-brown pistillate scales



k. *Carex nigricans* l. *C. paysonis* m. *C. phaeocephala* n. *C. pyrenaica*

have thin, paler margins. The hairy, brown perigynia are 2-5 mm long and narrowly elliptical to egg-shaped with a short beak. The achene is triangular in cross section.

Var. pseudoscirpoidea (Rydb.) Cronq. is usually less than 20 cm (8 in) tall and has perigynia that are relatively short and broad (egg-shaped). It is locally abundant in dry, alpine meadows on the high peaks at the northern end of the Bitterroot Range at 2620-2865 m (8,600-9,400 ft). Var. stenochlaena Holm is generally taller, 20-35 cm (8-14 in), with more narrowly elliptical perigynia. It is locally common on mossy shelves and rock crevices formed on banded gneiss throughout the Bitterroot Range at 1615-2650 m (5,300-8690 ft). Var. scirpoidea does not occur in our area. AK to CA, east to Greenl., NY, MI, CO, and AZ.

68. Carex breweri Boott

Brewer's Sedge

The stiff, erect stems of Brewer's sedge are 5-15 cm (2-6 in) tall and arise singly or in small clusters from slender, scaly rhizomes. The wiry leaves are about 1 mm wide and shorter than the stems. The solitary, egg-shaped spike has a few staminate flowers at the tip and pistillate flowers below. The light to dark brown, pistillate scales have pale tips and margins. The straw-colored to brownish, inflated perigynia are 4-8 mm long and egg-shaped or elliptical with a short beak. The achene is triangular in cross section.

This species forms large populations in moist saddles at 2710-2955 m (8,900-9,700 ft) on Trapper Peak, Ward Mountain, and St. Joseph's Peak in the Bitterroot Mountains. Our plants are var. paddoensis (Suskd.) Cronq. B.C. to CA, east to MT, WY, and CO.

The combination of small size, rhizomatous habit, and solitary spike with an inconspicuous staminate portion are distinctive.

69. Carex nova Bailey

New Sedge

[C. pelocarpa Herm.]

This densely tufted species has stems, 10-40 cm (4-16 in) tall, and short, slender rhizomes. The flat leaves are 2-5 mm wide and shorter than the stems. The base of the plants are purplish and often bear the remains of old leaves. The 3-5 black, sessile spikes are closely aggregated into a globose or egg-shaped head. The terminal spike has staminate flowers at the base and pistillate flowers above. The lower spikes are pistillate. The black, pistillate scales are narrower than the perigynia. The green to (more often) dark purplish perigynia are about 3-5 mm long, flattened, and elliptical or nearly round with a short, dark-colored beak. The achene is triangular in cross section.

In our area, new sedge has been found only above Chaffin Lake, southwest of Darby and on Ward Mountain, southwest of Hamilton, in the Bitterroot Mountains. WY and MT, south to NV, UT, CO, and NM.

See comments under C. albonigra (No.73)

70. Carex capillaris L.

Hair Sedge

This is a densely tufted sedge having slender, often lax stems, 5-20 cm (2-8 in) tall, with the remains of old leaves at the base. The flat leaves are 1-3 mm wide and clustered near the base of the plant. The open inflorescence consists of an erect, terminal, staminate (sometimes with a few pistillate flowers above) spike above 1-3 widely-separated pistillate spikes, each one arching or nodding on a long stalk and subtended by a narrow leaflike bract. The greenish or light brown pistillate scales have a pale, papery margin and are smaller than the perigynia. The shiny, dark green or brown perigynia are about 2-3 mm long and narrowly elliptical with a short, ill-defined beak. The achene is triangular in cross section.

Hair sedge has been collected twice in our area: in a seepage area on rock shelves in the Bitterroot Range and in a wet meadow near the crest of the Sapphire Range. Circumboreal, south in North America to OR, NV, NM, MI, and NY.

71. Carex bipartita Allioni

Two-parted Sedge

Two-parted sedge forms small clumps with fibrous roots and stems up to 15 cm (6 in). The flat leaves are 1-3 mm wide, clustered at the base, and shorter than the stems. The 2-4 (usually 3) small, sessile spikes are loosely aggregated in the inflorescence. Each spike has staminate flowers at the base and pistillate flowers above. The brown, pistillate scales have pale, papery margins and are as large as the perigynia. The brown perigynia are about 2-3 mm long and elliptical with a prominent suture down the length of the short beak. The achene is 2-sided in cross section.

Collected once in the Bitterroot Mountains at 2680 m (8,800 ft) above Chaffin Lake, southwest of Darby. Circumboreal, south in North America to B.C., UT, CO, and Que.

Two-parted sedge is similar to C. praeceptorum but the latter usually has at least 4 spikes per inflorescence and the pistillate scales are smaller than the perigynia.

72. Carex misandra R.Br.

Manhater Sedge, Few-flowered Sedge

A densely tufted sedge, this species has slender stems up to 20 cm (8 in) tall with the lower leaves reduced to scales. The flat or slightly channeled leaves are clustered near the base of the stems and 1-3 mm wide often with brown tips. The open inflorescence is subtended by a narrow, leaflike bract and



o. *Carex haydeniana* p. *C. scirpoidea* q. *C. breweri* r. *C. nova*

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consists of a terminal spike with staminate flowers at the base and pistillate flowers above and 2-3 well-separated pistillate spikes below borne on arching or drooping stalks. The dark brown or purplish-black, pistillate scales have a pale midvein and margins. The pale perigynia are 3-5 mm long and narrowly lance-shaped, tapering to a long, dark-colored beak. The achene is triangular in cross section.

Manhater sedge has been collected twice in the southern Bitterroot Range: at 2590 m (8,500 ft) on the east slope of Boulder Peak and at 2530 m (8,300 ft) on the north slope of Sugarloaf Peak. Circumboreal, south in North America to UT, CO, and Que.

Group VIII. This group contains sedges that occur in dry meadows and open, rocky soil of exposed ridges near or above timberline.

67. Carex scirpoidea var. pseudoscirpoidea Holm

Single-spike Sedge

This species occurs on mossy shelves and rock crevices in the alpine zone. See description above.

73. Carex albonigra Mack.

Black-and-white Sedge

Black-and-white sedge has short rhizomes and solitary or small tufts of stems, 10-30 cm (4-12 in) tall, that are reddish-purple at the base and clothed in the remains of old leaves. The short, flat leaves are 2-7 mm wide and shorter than the stems. The loosely congested inflorescence consists of 2-4 dark, egg-shaped spikes. There is a terminal one with staminate flowers below and pistillate flowers above and erect, pistillate spikes borne on short stalks and subtended by narrow, leaflike bracts below. The reddish-black, pistillate scales have papery, white margins and are mostly larger than the perigynia. The reddish-black perigynia are about 3-4 mm long, flattened, and egg-shaped in outline with a short beak. The achene is triangular in cross section.

This sedge is sparsely distributed on the alpine summits of the Bitterroot Range; however, it is locally abundant in a dry meadow on St. Joseph's Peak, southwest of Florence. B.C. to CA, east to Alta., MT, CO, and NM.

This species is similar to C. atrata and C. nova, and the three are distinguished by the degree to which the inflorescence is congested. The spikes of C. nova are sessile and closely congested; those of C. albonigra are congested, but the lower ones are stiffly short-stalked, while C. atrata has a more open inflorescence with the lower spikes borne on relatively long, slightly arching stalks.

74. Carex nardina Fries [C. hepburnii Boott]

Spikenard Sedge

This small sedge forms dense clumps with slender, wiry stems 3-12 cm (1-5 in) tall. The plants have numerous broken-off, old stems at the base. The wiry leaves are less than 1 mm wide and clustered at the base of the plant. The solitary, elongated, relatively few-flowered spike has a few staminate flowers at the tip and pistillate flowers below. The dull brown, pistillate scales are larger than the perigynia and have pale, narrow margins and a straw-colored midvein. The straw-colored perigynia are 3-5 mm long and lance-shaped or narrowly elliptical with a short, dark beak. The achene is either 2- or 3-sided in cross section.

Spikenard sedge is uncommon but widely distributed in open, gravelly soil of dry meadows and ridges in the alpine zone throughout the Bitterroot Mountains. Circumboreal, south in w. North America to WA, NV, UT, and CO.

75. Carex rupestris Allioni

Curly Sedge

Curly sedge has stems, 4-12 cm (2-5 in) tall, arising singly or in small clusters from strong, scaly rhizomes. The stems are reddish-brown at the base and clothed in the remains of old leaves. The flat or channeled leaves are crowded at the base, 1-3 mm wide, and short with dried, recurved tips. The single, oblong or linear spike has staminate flowers at the tip and pistillate flowers below. The chestnut-brown, pistillate scales have broad, pale, papery margins and a light midvein. The light brown perigynia are 3-4 mm long and narrowly elliptical with a short, indistinct beak. The achene is triangular in cross section.

Uncommon in dry, open, gravelly soil of ridge tops above timberline, often in close association with mats of Dryas octopetala. Curly sedge occurs on Lolo, Sweeney, St. Mary's and St. Joseph's peaks in the northern Bitterroot Range. It has not been found in the southern part of the range. Circumboreal, south in w. North America to UT and CO.

The curled, often brown leaf tips help to separate this species from other single-spike alpine sedges.

Cyperus L. Flatsedge

The members of this genus are annual (ours) or perennial, grasslike plants, mostly with triangular stems and 3-ranked, mainly basal leaves. Flowers lack petals and sepals and consist of an ovary and 3 stamens borne at the base of a scale. They are borne in small, flattened spikelets with the scales arranged in two ranks. The spikelets are clustered in globose heads, and the inflorescence consists of



s. *Carex capillaris* t. *C. bipartita* u. *C. misandra* v. *C. albonigra*

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numerous heads borne on stalks radiating from the top of the stem and subtended by long, leaflike bracts. The fruit is a 2- or 3-sided achene (double-walled seed).

1. Scales of the spikelet with a sharp-pointed, outwardly bent tip.....(1) C. aristatus
1. Scales of the spikelet with a straight, blunt tip.....(2) C. rivularis

1. Cyperus aristatus Rottb.

Awed Flatsedge

A tufted annual with sweet-scented herbage and stems 3-15 cm (1-6 in) tall. The few leaves are about 1-2 mm wide and borne near the base of the plant. The bracts subtending the inflorescence are shorter or longer than the inflorescence. The spikelets are borne in globose clusters. The scales of the spikelets are strongly nerved and have a sharp-pointed, outward-curved tip. The achene is triangular in cross section.

Awed flatsedge occurs in wet, open soil along river banks and the margins of sloughs and ponds in the valley. Worldwide except at high latitudes.

2. Cyperus rivularis Kunth

Shining Flatsedge

Shining flatsedge is a tufted annual with stems up to 20 cm (8 in) tall. The few, long leaves are about 1-2 mm wide and borne near the base of the plant. The leaflike bracts subtending the inflorescence are unequal in length, at least one of them longer than the inflorescence. The 1-several spikelets are borne in open, headlike clusters. The scales of the spikelets are blunt with a pale midrib. The achenes are mostly 2-sided in cross section.

This rare species has been collected from a mudflat along the Bitterroot River near its confluence with Bass Creek. Most of the U.S. and s. Can., south to South America.

Dulichium Pers. Dulichium

Dulichium arundinaceum (L.) Britt.

Dulichium

Dulichium is a perennial herb with hollow, rounded stems, 30-100 cm (12-40 in) tall, arising from strong, deep-seated rhizomes. The leaves on the lower half of the stem are reduced to bladeless sheaths. The upper, grasslike leaves are short, 2-8 mm wide, and gradually reduced upwards. Flowers consist of an ovary, 3 stamens, and petals and sepals reduced to 6-9 bristles, each subtended by a scale. They are borne in congested, linear spikelets resembling elongated ears of corn. The 7-10 spikelets are arranged in open, 2-sided spikes borne in the axils of the upper leaves.

Collected in wet, boggy soil in the Rattlesnake Mountains. B.C. to CA, east to Newf. and FL.

Eleocharis R. Br. Spike Rush

Spike rushes are annual or perennial herbaceous plants that have needle-shaped or flattened stems with leaves reduced to sheaths or sheathing scales. Each flower is subtended by a papery scale and consists of an ovary with 3 stamens and the petals and sepals reduced to bristles at the base of the ovary or completely lacking. The flowers are spirally arranged in a single, congested spike at the tip of the stem. The fruit is an achene (seed with a hard dry coat) that is 2- or 3-sided in cross section. The thickened base of the style persists as a small projection (tubercle) on the top of the achene.

Most species mature fairly late in the growing season, and mature fruit is necessary for positive identification.

1. Stigmas 3; achene 3-sided or rounded in cross section.....2
1. Stigmas 2 (rarely 3); achene 2-sided (lens-shaped) in cross section.....4
2. Tubercle cone-shaped, without a groove around the base separating it from the body of the achene.....(3) E. pauciflora
2. Tubercle more disk-shaped, with a basal groove.....3
3. Plants perennial; anthers (dry) >0.7 mm long; flower scales >1.5 mm long.....(2) E. acicularis
3. Plants annual; anthers <0.5 mm long; flower scales <1.5 mm long.....(4) E. bella
4. Tubercle constricted where it joins the body of the achene; common.....(1) E. palustris
4. Tubercle flattened and not constricted at the base; uncommon.....(5) E. ovata



w. *Carex nardina* x. *C. rupestris* y. *Cyperus rivularis* z. *C. aristatus*

CYPERACEAE

Group I. This group contains perennial species occurring from the valleys to high elevations.

1. Eleocharis palustris (L.) R. & S.

Common Spike Rush

A rhizomatous species with slender to robust stems, 10-60 cm (4-24 in) tall, arising singly or in loose tufts. The lower sheaths are dark red to brownish purple. The spikelet is 5-23 mm long and lance-shaped in outline. The brown flower scales have a pale or greenish midvein and pale margins. The achene is 2-sided with 4-6 bristles at the base and a prominent tubercle that is constricted where it meets the body of the achene.

Common spike rush is a variable species and is the most common member of the genus in our area, occurring in many wet, or vernal wet, open habitats in the valley and montane zones. Widespread in temperate and boreal regions of the Northern Hemisphere.

2. Eleocharis acicularis (L.) R. & S.

Needle Spike Rush

Needle spike rush is a small, rhizomatous plant usually forming dense tufts with slender stems 3-12 cm (1-5 in) tall. The basal sheaths are pale to purplish. The 3- to several-flowered spikelet is 2-7 mm long. The brown flower scales have a green midvein and pale or reddish margins. The achene is rounded or 3-sided with 0-4 bristles at the base. The tubercle is somewhat flattened.

Common species, it often forms extensive mats on mudflats bordering lakes, ponds, or slow-moving rivers and streams. In our area it occurs up to 2135 m (7,000 ft). Circumboreal, south in North America to FL and Mex.

3. Eleocharis pauciflora (Lightf.) Link

Few-flowered Spike Rush

This spike rush has stems 5-20 cm (2-8 in) tall and forms small tufts from short, stout rhizomes as well as slender, stolonlike rhizomes with thickened terminal buds. Sheaths are brown. The 3-9 flowered spikelet is 2-6 mm long. The dark brown or black flower scales have pale margins. The achene is 2- or 3-sided in cross section with 2-6 bristles arising from the base. The tubercle is broadly conical.

Common in wet meadows and along the margins of lakes and ponds at 1890-2680 m (6,200-8,800 ft) in the Bitterroot Mountains. Circumboreal, south in North America to CA, NM, IL, and NJ.

Group II. These 2 uncommon, annual species occur in the valleys and the montane zone.

4. Eleocharis bella (Piper) Svenson

Delicate Spike Rush

This small species forms dense tufts with slender stems up to 8 cm (3 in) tall. It is similar to E. acicularis in most respects, but can be distinguished by its annual habit and by having smaller flower scales and anthers (see key).

Delicate spike rush has been collected around sloughs of the Bitterroot River south of Missoula and at Lolo Hot Springs. WA to CA, east to ID, MT, and NM.

5. Eleocharis ovata (Roth) R. & S.

Egg-shaped Spike Rush

Egg-shaped spike rush forms dense tufts with ribbed stems 5-30 cm (2-12 in) tall. The egg-shaped spikelets are 5-13 mm long and have at least 40 flowers. The brown or purplish flower scales have a green midvein and a pale margin. The 2-sided achene has about 6-7 bristles at the base and a low, inconspicuous tubercle.

Collected only around sloughs of the Bitterroot River south of Missoula. Widespread in the Northern Hemisphere.

Eriophorum L. Cotton Grass

These plants are perennials with mostly solid, triangular, or round stems from rhizomes (ours) or fibrous roots. The lower leaves are grasslike with closed sheaths; the upper leaves are often bladeless. Flowers are subtended by a scale and consist of an ovary, 3 stamens, and numerous (more than 10) elongated bristles at the base of the ovary. The flowers are spirally arranged in spikes that resemble tufts of cotton at maturity due to the abundant, long flower bristles. The terminal inflorescence is subtended by 1-several short or elongated and leaflike bract and consists of 1-several sessile or short-stalked spikes. The achene (seedlike fruit) is triangular in cross section.

1. Inflorescence of a solitary, terminal spike.....(1) E. chamissonis
1. Inflorescence of 2-8 stalked spikes.....(2) E. polystachion



a. *Dulichium arundinaceum* b. *Eleocharis palustris* c. *E. acicularis*

CYPERACEAE

1. Eriophorum chamissonis C. A. Mey.

Cotton-sedge

This species has stout stems, 25-50 cm (10-20 in) tall, from long, creeping rhizomes. The few leaves occur near the base of the plant and are about 2 mm wide and channeled or triangular. The inflorescence is a solitary, erect spikelet borne at the tip of the stem. The blackish-green, flower scales have pale margins and tips. The bristles of the achene are usually rust-colored or sometimes nearly white.

Cotton-sedge occurs in organic soil of bogs and wet meadows, often with Sphagnum moss, at 1525-2285 m (5,000-7,500 ft) in widely scattered locations in all three mountain ranges in our area. Circumboreal, south in North America to OR, WY, MN, and N.B.

2. Eriophorum polystachion L.

Many-spiked Cotton Grass

Many-spiked cotton grass has stems, 20-50 cm (8-20 in) tall, from stout, creeping rhizomes. The grasslike leaves are 2-6 mm wide and flat, becoming narrow and channeled toward the tip. The inflorescence is subtended by 2-few narrow, leaflike bracts and consists of 2-8 spikelets borne on stalks from the top of the stem. The blackish-green flower scales have a midvein that does not extend all the way to the tip. The bristles of the achene are white.

Known only from around beaver dams on the East Fork of the Bitterroot River. Circumboreal, south in North America to OR, UT, NM, IA, MI, and NY.

Scirpus L. Bulrush

Our species are all perennials with mostly solid, triangular or round stems. The leaves are grasslike or reduced to sheathing scales. Flowers consist of an ovary, 3 stamens, and 2-6 bristles at the base of the ovary. Each flower is subtended by a firm, thin scale, and they are spirally arranged in compact, egg-shaped or elliptical spikelets. The spikelets are borne in compact, headlike clusters or are stalked in more open inflorescences. The inflorescence is subtended by 1-several bracts that are small or elongated and leaflike and spreading or stiffly erect and appearing to be part of the stem. The fruit is a double-coated seed (achene) that is 2- or 3-sided in cross section.

1. Inflorescence subtended by a single, erect, green bract that appears like a continuation of the stem; the inflorescence thus appear to be arising from the side of the stem.....2
1. Inflorescence subtended by 2-several leaflike bracts not held erect; the inflorescence thus appears to be terminal.....4
2. Stems triangular in cross section; inflorescence a single headlike cluster of spikelets.....(6) S. americanus
2. Stems round in cross section; inflorescence compound.....3
3. Flower scales with fine reddish-brown lines sharply contrasting with the pale background.....(1) S. acutus
3. Flower scales with fine lines that do not contrast sharply with the brown background....(2) S. validus
4. Bristles at the base of the achene much longer than achene and giving the spikelets a woolly appearance.....(4) S. cyperinus
4. Bristle at the base of the achene ca. as long as the achene, spikelets not appearing woolly.....5
5. Leaf sheaths usually reddish-purple at the base, achene 2-sided in cross section....(3) S. microcarpus
5. Leaf sheaths not reddish purple, achene 3-sided in cross section.....(5) S. pallidus

Group I. These rhizomatous species are tall and appear to lack leaves. They are found in water up to 1 m (40 in) deep and often occupy large areas.

1. Scirpus acutus Muhl.

Hardstem Bulrush

Hardstem bulrush has stiff, round, dark green stems up to 3 cm in diameter and up to more than 2 m (6 ft) tall. The leaves are all borne at the base of the stems and have prominent sheaths but lack blades. The grayish-brown spikelets are sessile in small groups at the end of stiff stalks that are grouped in an open, umbrellalike inflorescence. The inflorescence is subtended by a long cylindrical bract that is held erect and appears to be a continuation of the stem. The inflorescence thus appears to be borne on the side of the stem. The thin, papery, flower scales have numerous deep, reddish-brown stripes on a pale, whitish background and a short awned tip.

Locally common in marshy areas around lakes, ponds, and backwaters in the valley. Widespread in temperate North America.

2. Scirpus validus Vahl

Softstem Bulrush

Softstem bulrush is very similar to S. acutus in most respects; however, it can be distinguished by having stems that are often lighter green and less rigid. In addition, the flower scales are reddish-brown throughout with brownish stripes that are barely discernable.



d. *Eleocharis pauciflora* e. *E. bella* f. *E. ovata* g. *Eriophorum chamissonis* h. *E. polystachion*

GRAMINEAE

Locally abundant in marshy areas around lakes, ponds, and backwaters in the valley. Widespread in temperate North America.

Group II. The species in this group are large, grasslike plants with well-developed leaves and 2-several prominent leaflike bracts subtending the inflorescence.

3. Scirpus microcarpus Presl

Small-fruited Bulrush

This coarse plant has loosely clustered stems, 40-100 cm (16-40 in) tall, from stout rhizomes. The flat, grasslike leaves are 8-15 mm wide with sheaths that are typically reddish-purple at the base. The spikelets are clustered in small heads at the ends of short or long stalks. This umbrellalike inflorescence is subtended by several, long leaflike bracts. The straw-colored to greenish-black, flower scales have a paler midvein and a minute point at the tip. The achene is 2-sided in cross section.

Small-fruited bulrush occurs in numerous moist or wet habitats, including shores, ditch banks, and along creeks in the valley and montane zones. B.C. to CA, east to Newf., WV, and NM.

4. Scirpus cyperinus (L.) Kunth

Wool Grass

[S. atrocinctus Fern.]

Wool grass is a tall, slender plant with stems, 70-150 cm (2-5 ft) tall, and fibrous roots that form dense clumps. The flat, grasslike leaves are 2-6 mm wide. The numerous individual spikelets are stalked and borne in an open, compound inflorescence. The inflorescence is subtended by several, conspicuous, leaflike bracts that are sheathless and blackened at the base. The blunt flower scales have fine, reddish-brown stripes on a pale or blackish-green background. The 6 slender bristles at the base of each achene are much longer than the scales and give the spikelets a woolly appearance. The achene is triangular in cross section.

Recently collected north of Missoula. B.C. and WA, east to Newf., FL, and TX.

5. Scirpus pallidus (Britt.) Fern.

Pale Bulrush

Pale bulrush has loosely clustered, triangular stems, 60-150 cm (2-5 ft) tall, from short rhizomes. The flat, grasslike leaves are 6-15 mm wide. The numerous, sessile spikelets are arranged in 1-several sessile, dense, headlike clusters borne at the ends of short or long stalks. This open inflorescence is subtended by several long, leaflike bracts. The greenish-black scales have a greenish or brownish midvein that is prolonged into a short awn at the tip. The achene is triangular in cross section.

Rare in the northern part of our area. WA and OR, east to MN, MO, and TX.

Group III. The single species in this group is usually smaller than those of preceding groups and has few leaves and a compact, sessile inflorescence.

6. Scirpus americanus Pers.

American Bulrush

[S. pungens Vahl]

This species is rhizomatous with triangular stems, 15-80 cm (6-32 in) tall, arising singly or occasionally in small clusters. The few leaves are channelled, folded, or flat, 1-4 mm wide, and borne near the base of the stem. Some or all of the leaves may be reduced to little more than sheaths. The 1-6 sessile spikelets are borne in a dense cluster subtended by a prominent, erect, bract that is triangular in cross section and appears to be a continuation of the stem. The inflorescence thus appears to be borne on the side of the stem. The reddish-brown flower scales have a short awn protruding from a wide notch at the tip. The achene is 2- or 3-sided in cross section.

American bulrush has been collected along the Clark Fork River near Missoula. Much of temperate North America as well as South America, Europe, New Zealand, and Australia.

GRAMINEAE (Poaceae) Grass Family

Grasses are annual or perennial herbs with rounded or flattened stems (culms) that are hollow except at the nodes. The parallel-veined leaves are usually long and narrow and 1 per node. Each leaf consists of a sheath that is wrapped around the stem and a blade. Where the sheath and blade join, there is usually a small, membranous projection of the sheath (ligule). At the top of the sheath, many species have a small lobe on either side that projects around the stem (auricle). The inflorescence varies from very open to dense spikes composed of 1-numerous spikelets. Each spikelet consists of 2 bracts (glumes) that subtend 1-several flowers (florets). In most species, a floret consists of two bractlike flower parts called the lemma (outer) and the palea (inner), and these enclose an ovary with the style and 3 stamens. The fruit consists of a 1-seeded grain enclosed in the lemma and palea.

This is the most economically important family of plants on earth. It contains all the important cereal crops as well as forage grasses essential to the raising of domesticated livestock.



i. *Scirpus acutus* j. *S. validus* k. *S. microcarpus*



l. *Scirpus cyperinus* m. *S. pallidus* n. *S. americanus*

1. Spikelets mostly replaced by small bulbs enclosed by leaflike lemmas.....Poa bulbosa
1. Spikelets not replaced by bulbs.....2
2. Plant mat-forming annual; spikelets borne among tufts of leaves that are spaced on the otherwise naked stems.....Munroa
2. Plants not as above.....3
3. Spikelets mostly in pairs, one of which is fanlike and composed of glumes and several, sharp-pointed lemmas; spikelets borne on very short stalks in a spikelike inflorescence.....Cynosurus
3. Spikelets not as above.....4
4. Spikelets in groups of 2 or 3, in an open inflorescence, one of the spikelets perfect (both stamens and pistils present), the other(s) with only stamens; rare and not persistent introduced weed.....Sorghum
4. Inflorescence not as above.....5
5. Spikelets sessile, forming terminal or lateral spikes.....Group A
5. Spikelets stalked in open to contracted and spikelike inflorescences.....6
6. Spikelets 1-flowered.....Group B
6. Spikelets 2- to many-flowered.....7
7. At least one glume equal to or greater than the lowest lemma.....Group C
7. Both glumes shorter than the lowest lemma.....Group D

Group A

1. Spikes usually >1 and borne on the side of the culm, not continuous with the main axis.....2
1. Spikes solitary and borne at the top of the culm, continuous with the main axis.....5
2. Weedy plants of lawns and gardens.....Digitaria
2. Plants of grassland or wetland habitats.....3
3. Plants nearly glabrous annuals; glumes inflated.....Beckmannia
3. Plants rhizomatous or bunch-forming perennials; glumes not inflated.....4
4. Plants forming tufts or bunches; culms <40 cm (16 in) tall; occurring in dry grassland habitats.....Bouteloua
4. Culms mostly arising singly from rhizomes and >30 cm (12 in) tall; occurring in moist, wet, or vernal wet habitats.....Spartina
5. Spikelets mostly 1 per node.....6
5. Spikelets > 1 per node.....10
6. Spikelets turned with the edges adjacent to the axis of the spike.....Lolium
6. Spikelets with the face adjacent to the axis of the spike.....7
7. Glumes awl-shaped, 1-nerved; spikelets 2-flowered.....Secale
7. Glumes lance-shaped or broader, >1 nerved; spikelets mostly >2-flowered.....8
8. Plants perennial.....Agropyron
8. Plants annual.....9
9. Spikelets sunken into depressions in the axis of the inflorescence.....Aegilops
9. Spikelets sessile but not sunken into the axis of the inflorescence.....Triticum
10. Spikelets egg-shaped or elliptical at maturity, awnless with 1 fertile flower.....Setaria
10. Spikelets not as above.....11
11. Most spikelets 1-flowered.....12
11. Spikelets usually >1 flowered.....14
12. Awns of lemma >7 mm long.....Hordeum
12. Lemmas unawned or with an awn <5 mm long.....13
13. Lemmas with short awns.....Alopecurus
13. Lemmas unawned.....Phleum

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14. Florets subtended by numerous awns; axis of spike fragile and easily breaking at the nodes.....Sitanion
 14. Florets not subtended by awns; spike not easily breaking (occasional specimens of Agropyron) may key here).....Elymus

Group B

1. Lemmas with a terminal 3-parted awn.....Aristida
 1. Awns of lemmas lacking or not 3-parted.....2
 2. Lemmas hardened, often with a sharp-pointed base.....3
 2. Lemmas not hardened, of the same texture as the glumes, base not noticeably hard and sharp.....4
 3. Awn spirally twisted; lemmas usually >6 times as long as wide.....Stipa
 3. Awn not twisted; lemmas usually <6 times as long as wide.....Oryzopsis
 4. Spikelets lacking glumes, consisting of one lemma and palea.....Leersia
 4. Glumes present.....5
 5. Spikelets with 2 narrow, sterile lemmas at the base of the fertile lemma.....Phalaris
 5. Spikelets lacking such sterile lemmas.....6
 6. Spikelets nearly sessile to short-stalked in several spikelike branches of the inflorescence.....Echinochloa
 6. Spikelets and inflorescence not as above.....7
 7. Spikelets very short-stalked and congested in a dense, cylindrical inflorescence usually at least 4 mm wide.....8
 7. Spikelets borne on erect or spreading branches in a narrow or open but not cylindrical inflorescence.....10
 8. Both glumes with awns >5 mm long.....Polypogon
 8. Glumes unawned or with awns <5 mm long.....9
 9. Lemmas awned; glumes unawned.....Alopecurus
 9. Glumes awned; lemmas unawned, sometimes with a small awn-tip.....Phleum
 10. One or both glumes as long as or greater than the lemma.....11
 10. Glumes shorter than the lemma.....14
 11. Plant a rhizomatous perennial >70 cm (28 in) tall with leaf blades 7-15 mm wide.....Cinna
 11. Plants not as above.....12
 12. Floret without a conspicuous tuft of hairs at the base.....Agrostis
 12. Floret with a conspicuous tuft of hairs at the base.....13
 13. Awn arising from the tip of the lemma.....Muhlenbergia
 13. Awn arising from near the middle of the back of the lemma.....Calamagrostis
 14. Leaf sheaths with a ring of dense, spreading hairs at the top.....Sporobolus
 14. Leaf sheaths lacking ring of hairs at the top.....15
 15. Glumes and/or lemmas awned.....Muhlenbergia
 15. Glumes and lemmas unawned.....Catabrosa

Group C

1. Two staminate florets below the single perfect (staminate and pistillate) floret.....Hierochloa
 1. Spikelets not as above.....2
 2. Florets 2 in each spikelet, 1 staminate and 1 perfect (with both stamens and pistils).....3
 2. Spikelets with 2 or more perfect florets or all florets unisexual.....4
 3. Lower floret with stamens only; lemma awned.....Arrhenatherum
 3. Lower floret with both stamens and a pistil; lemma unawned.....Holcus
 4. Lemmas without awns.....5
 4. Lemmas awned.....7

5. Leaf tips not shaped like the prow of a boat.....Trisetum
5. Leaf tips shaped like a prow.....6
6. Spikelets congested on short branches in a spikelike inflorescence.....Koeleria
6. Spikelets not congested on short branches; inflorescence sometimes narrow but not congested.....Poa
7. Spikelets 8 mm long or less.....8
7. Spikelets >8 mm long.....10
8. Spikelets 2-4 mm long; second glume much wider than the first.....Sphenopholis
8. Spikelets 4-8 mm long; glumes nearly the same size and shape.....9
9. Lemmas 2-lobed at the tip; awn arising from above the middle.....Trisetum
9. Lemmas with jagged tips but not distinctly 2-lobed; awn arising from near or below the middle.....Deschampsia
10. Appendage on the upper surface at the base of the leaf blade (ligule) a fringe of short hairs.....Danthonia
10. Ligules membranous.....11
11. Glumes >10 mm long; weedy annuals.....Avena
11. Glumes <10 mm long; native perennials.....Trisetum

Group D

1. Plants stout reeds at least 2 m (80 in) tall; occurring in wet habitats.....Phragmites
1. Plants rarely >2 m tall and occurring in wet habitats.....2
2. Unisexual grasses, staminate and pistillate florets on different plants.....3
2. Plants with at least some florets with both stamens and pistil.....4
3. Leaf sheaths long-hairy at the top.....Distichlis
3. Leaf sheaths glabrous or short-hairy.....Poa
4. Tips of leaf blades usually shaped like the prow of a boat.....5
4. Leaf tips not shaped like a prow.....6
5. Spikelets congested on short branches in a spikelike inflorescence.....Koeleria
5. Spikelets not congested on short branches; inflorescence sometimes narrow but not congested.....Poa
6. Base of the floret with a tuft of straight hairs; lemmas otherwise hairless.....7
6. Florets not as above.....8
7. Lemmas ca. 10 mm long.....Schizachne
7. Lemmas mostly <7 mm long.....Trisetum
8. Spikelets clustered at the ends of stiff, nearly erect branches of the inflorescence; lemmas with long, stiff hairs on the midvein and margins.....Dactylis
8. Inflorescence and lemmas not combined as above.....9
9. Spikelets usually 2-flowered, congested in a spikelike inflorescence; second glume much broader than the first.....Sphenopholis
9. Spikelets and glumes not combined as above.....10
10. Lemmas with 3 prominent nerves.....11
10. Lemmas with >3 prominent nerves or nerves indistinct.....12
11. Appendage at the base of the leaf blade (ligule) membranous; spikelets usually >2-flowered; native grass of wet habitats.....Catabrosa
11. Ligule a fringe of hairs; spikelets usually 2-flowered; weedy grasses of dry habitats.....Eragrostis
12. Lemmas obtuse at the top, usually with ragged margins, unawned.....13
12. Lemmas pointed at the tip, often awned.....14
13. Second glume 3-nerved; leaf sheaths with free margins, at least towards the top.....Puccinellia
13. Second glume 1-nerved; leaf sheaths closed to the top.....Glyceria
14. Stems usually bulbous at the base just below ground level; uppermost floret usually sterile.....Melica
14. Plants not with the above combination of characters.....15

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15. Lemmas 2-lobed at the tip; awn, if present, arising from just below the base of the notch.....Bromus
 15. Lemmas not 2-lobed; awn arising from the tip.....Festuca

Aegilops L. GoatgrassAegilops cylindrica Host

Goatgrass

An annual with erect stems 10-50 cm (4-20 in) tall that often branch from the base, goatgrass has leaves with flat blades 2-3 mm wide and sparsely long-hairy sheaths. The sessile spikelets are borne 1 per node in a terminal, narrowly cylindrical spike 5-10 cm (2-4 in) long. Each spikelet has 2-5 flowers enclosed by glumes that are keeled on the back and short-awned at the tip. Lemmas of the upper spikelets have awns up to 5 cm (2 in) long, while those of the lower spikelets lack awns.

This weedy, European grass has been collected near Hamilton. Eastern WA, MT, and much of the U.S. (Not illustrated).

Agropyron Gaertn. Wheatgrass

The wheatgrasses are rhizomatous or bunch-forming perennials of mainly dry habitats. The leaves have flat or rolled blades and sheaths with free margins and usually evident auricles. The 3- to 12-flowered spikelets are sessile in a narrow, terminal spike. The 2 glumes in each spikelet are about equal in length and shorter than the lowest lemma. Both glumes and lemmas are sometimes awned from the tip.

This is a difficult group taxonomically. Hybridization among various species and between other closely related genera such as Elymus, Hordeum, and Sitanion has been reported. Many species treated here have been placed in other genera by various authorities.

1. Plants forming tufts or bunches, rhizomes lacking.....2
1. Plants rhizomatous, not forming bunches.....5
2. Spikelets rigidly spreading and crowded, some as much as 4 times as long as the spaces between the nodes of the inflorescence.....(3) A. cristatum
2. Spikelets more erect and less crowded, rarely more than 3 times as long as the spaces between the nodes of the inflorescence.....3
3. Anthers ca. 5 mm long; spikelets relatively distant from each other, ca. as long as the distance between the nodes of the inflorescence.....(1) A. spicatum
3. Anthers <3 mm long; spikelets more crowded, mostly 2-3 times as long as the distance between the nodes of the inflorescence.....4
4. Lemmas with widely spreading awns 2-5 cm long; stems usually curved at the base to nearly prostrate.....(4) A. scribneri
4. Lemmas with a straight or slightly divergent awn up to 2 cm long; stems erect.....(2) A. caninum
5. Glumes and lemmas blunt or rounded at the tip.....(8) A. intermedium
5. Glumes pointed or awned at the tip; lemmas mostly pointed or awned.....6
6. Leaf blades flat and mostly 5-10 mm wide; foliage not bluish with a waxy coating; plants mostly of roadsides, gardens, or other disturbed habitats.....(7) A. repens
6. Leaf blades mostly rolled and <5 mm wide; foliage often bluish with a waxy coating; plants of more undisturbed habitats.....7
7. Glumes with 5-7 nerves on the surface, broadest near the middle; lemmas usually densely covered with short hairs.....(5) A. dasystachyum
7. Glumes with 3-5 nerves, narrowed from near the tip; lemmas glabrous or sparsely hairy.....(6) A. smithii

Group I. These species have fibrous roots and form bunches.

1. Agropyron spicatum (Pursh) Scribn. & Smith
 [Elymus spicatus (Pursh) Gould]

Bluebunch Wheatgrass

Bluebunch wheatgrass forms large clumps with culms that are 40-100 cm (16-40 in) tall and flat or rolled leaf blades about 1-3 mm wide. The foliage is light or blue-green and usually glabrous with a thin waxy coating. The inflorescence has 1 spikelet per node, the spikelets barely overlapping. The glabrous or roughened glumes, 7-9 mm long, are rounded or pointed at the tip, sometimes with a short awn. The glabrous to short-hairy lemmas, 8-11 mm long, usually have a bent awn 1-2 cm long.

This is the most important native grass in the dry grasslands of the valleys and foothills. It is often associated with Koeleria cristata, Festuca idahoensis, and Poa sandbergii. It can be found from the valleys to the subalpine zones. AK to CA, east to Alta., SD, and NM.

Bluebunch wheatgrass is the state grass of Montana. It is easily damaged by overgrazing and has been replaced by exotic species throughout much of our area. It is considered an indicator of good condition grasslands and is used as an indicator species for many grassland and forest habitat types.

2. Agropyron caninum (L.) Beauv.

Bearded Wheatgrass, Slender Wheatgrass

[Elymus trachycaulus (Link) Gould]

This bunch-forming wheatgrass has culms 40-100 (16-40 in) tall, and leaf blades that are 2-5 mm wide and usually flat. The sheaths are glabrous to finely hairy, and the blades are roughened to long-hairy. The auricles are lacking or up to 1 mm long. The inflorescence, 4-15 cm (1-6 in) long, is congested with 1 spikelet per node, these overlapping to a large degree. The glumes are pointed or awned and 3/4 as long as the first lemma. The glabrous to short-hairy lemmas are awnless or with a straight or bent awn.

In our area, this species is represented by 4 varieties that are often treated as separate species. These varieties are all placed in ssp. majus (Vasey) Hitchc.:

Var. andinum (Scribn. & Smith) Hitchc. [A. subsecundum A.S. Hitchc.] has a more congested inflorescence with spikelets 2.5-3 times as long as the space between them and awns 8-20 mm long. It is infrequent in mesic grasslands from the valleys up to the subalpine zones.

Var. latiglume (Scribn. & Smith) Hitchc. [A. trachycaulum (Link) Malte var. latiglume Beetle] also has a congested inflorescence but the awns are only up to 5-6 mm long. It is infrequent in drier grasslands from the valleys to the subalpine zones and does not occur in the Bitterroot Mountains.

Var. majus [A. violaceum var major Vasey] has a more open inflorescence with spikelets that are 2-2.5 times as long as the space between them and lemmas that are unawned or with short awns up to 5 mm long. This variety is infrequent in dry grasslands from the valleys to the lower subalpine zone.

Var. unilaterale (Vasey) Hitchc. [A. trachycaulum (Link) Malte] also has a more open inflorescence and awns that are mostly 10-25 mm long. It is infrequent in more mesic grasslands from the valleys to the subalpine zones.

The species as a whole is found throughout much of North America and Eurasia.

3. Agropyron cristatum (L.) Gaertn.

Crested Wheatgrass

Crested wheatgrass is densely tufted with culms that are 25-100 cm (10-40 in) tall and flat leaf blades with auricles about 1 mm long. The foliage is usually somewhat hairy. The spikelets are 1 per node and closely overlapping in the inflorescence. The glumes and lemmas have short awns 2-4 mm long.

Locally common along roads and in dry, formerly overgrazed grasslands in the valleys. Introduced from Russia in 1898 as a forage plant, it is now established in much of the w. U.S.

4. Agropyron scribneri Vasey

Alpine Wheatgrass

[Elymus scribneri (Vasey) Jones]

Alpine wheatgrass has culms that are curved at the base or sometimes nearly prostrate and up to 25 cm (10 in) long. Leaf blades are usually slightly rolled and 2-4 mm wide. The foliage is more or less hairy. The inflorescence is often purplish and crowded with 1 or occasionally 2 spikelets per node. The glumes are 6-9 mm long and prolonged into a slender, spreading awn. The lemmas are also awned.

A plant of exposed ridge tops or talus near or above timberline, this species is uncommon in our area, known only from a few high summits in the southern Bitterroot Mountains. B.C. and WA, east to MT, WY, and NM.

See note under Sitanion hystrix.

Group II. The species in this group are native and rhizomatous with elongated spikes and mostly bluish, waxy foliage.

5. Agropyron dasystachyum (Hook.) Scribn.

Thick-spike Wheatgrass, Northern Wheatgrass

[Elymus lanceolatus (Scribn. & Smith) Gould]

This wheatgrass has erect culms 40-80 cm (16-32 in) tall and leaf blades that are 2-4 mm wide and usually rolled. The foliage has a waxy covering and is mostly glabrous to somewhat hairy. The inflorescence has 1 or sometimes 2 spikes per node that are mostly widely spaced on the axis of the spike. The glumes are pointed or short-awned and often covered with short hairs. The lemmas are sparsely to densely short-hairy and evidently longer than the glumes.

In our area, thick-spike wheatgrass is uncommon in dry grasslands in the valley and montane zones. It has been collected in the Clark Fork Valley and near Corvallis. B.C. to CA, east to Alta., MI, CO, and NV.

6. Agropyron smithii Rydb.

Western Wheatgrass

[Elymus smithii (Rydb.) Gould]

Western wheatgrass has culms 40-90 cm (16-36 in) tall and rolled leaf blades that are 2-4 mm wide. The foliage is glabrous and usually blue-green with a thin, waxy coating. The inflorescence has 1-2 well-separated spikelets per node. The rigid glumes are usually glabrous and tapered from the base to the



a. *Agropyron spicatum* b. *A. caninum* c. *A. cristatum*

pointed or short awn-tip. The lemmas often have a short awn-tip up to 5 mm long and are mostly glabrous, the lowest barely longer than the glumes.

This common Great Plains species is infrequent in dry to moist, at least somewhat alkaline soils in the valley and foothills on the east side of the Bitterroot Valley. B.C. to NV, east to Ont., NY, TN, and TX.

Group III. This group contains two introduced rhizomatous species.

7. Agropyron repens (L.) Beauv.
[Elymus repens (L.) Gould]

Quackgrass

Quackgrass has wiry, sharp-pointed rhizomes, flat blades 5-10 mm wide, well developed auricles, and culms up to 100 cm (40 in) tall. The foliage is glabrous or more often short-hairy, especially on the lower sheaths. Spikelets are crowded in the inflorescence. The mostly awn-tipped glumes are 6-7 mm long. The glabrous or roughened lemmas are awnless or with an awn up to 10 mm long. The lowest lemma is barely longer than the glumes.

A bothersome weed, it is common in rich, mesic soils, often along roads, in gardens and abandoned fields in the valleys. Widespread in much of temperate and boreal North America.

8. Agropyron intermedium (Host) Beauv.
[Elymus hispidus (Opiz) Melderis]

Intermediate Wheatgrass

This wheatgrass has culms up to or even exceeding 100 cm (40 in) tall and stiff, rolled leaf blades with sheaths that have long hairs on the margins. The spikelets are spaced relatively far apart in the inflorescence. The glumes are 7-9 mm long and rounded or blunt at the tip. The glabrous or roughened lemmas are also blunt-tipped.

Intermediate wheatgrass has been collected on roadsides near Missoula, Hamilton, and Darby. Introduced in western and central U.S. and adjacent Can.

Agrostis L. Bentgrass

Our bentgrasses are tufted or rhizomatous annuals or perennials with sheaths that have free margins. Spikelets are stalked and borne in an open or contracted inflorescence. Each spikelet has only 1 floret. The glumes are about equally long and mostly pointed at the tip. The lemma is shorter than the glumes and has long to short hairs at the base and sometimes an awn arising from the back. The palea is very small or lacking.

Agrostis is a very difficult genus, and some specimens may not be identifiable with the following semi-technical key. Nonetheless, this key should identify most plants correctly.

1. Inflorescence narrow and more or less spike-like and congested, branches nearly erect.....2
1. Inflorescence more open, branches widely spreading or ascending.....7
2. Plants annual; lemmas with awns 6-7 mm long.....(5) A. interrupta
2. Plants perennial; lemmas usually awnless or with an awn shorter than 6 mm.....3
3. Plants strongly rhizomatous, not tufted.....(1) A. alba
3. Plants usually forming tufts.....4
4. Palea at least 1/2 as long as the lemma.....5
4. Palea minute or lacking.....6
5. Plant short rhizomatous and usually >15 cm (6 in) tall.....(6) A. thurberiana
5. Plants not rhizomatous, usually <15 cm tall.....(9) A. humilis
6. Culms <20 cm (8 in) tall; leaf blades <2 mm wide.....(10) A. variabilis
6. Culms >20 cm tall; leaf blades mostly >2 mm wide.....(8) A. exarata
7. Plants strongly rhizomatous or with runners, not forming tufts.....8
7. Plants tufted without long rhizomes or runners.....9
8. Ligules 3-6 mm long; branches of the inflorescence mostly with spikelets to near the base..(1) A. alba
8. Ligules 1-3 mm long; inflorescence branches with spikelets only on the terminal portion..(2) A. tenuis
9. Palea at least 1/2 as long as the lemma.....(6) A. thurberiana
9. Palea minute or lacking.....10
10. Anthers >1 mm long.....(4) A. diegoensis
10. Anthers <1 mm long.....11



d. *Agropyron dasystachyum* e. *A. smithii* f. *A. repens* g. *A. scribneri*

11. Lemmas usually with a bent awn.....(11) A. borealis
 11. Lemmas without an awn or with a short straight awn.....12
12. Branches of inflorescence slender and never branching or spikelet-bearing below midlength.....(3) A. scabra
 12. Branches of inflorescence with side branches and spikelets below midlength.....(7) A. idahoensis

Group I. The species in this group are most common in moist or wet, open habitats, often in cultivated fields in the valleys and foothills.

1. Agrostis alba L. Redtop, Creeping Bentgrass
 [A. stolonifera L.]

Redtop is a rhizomatous perennial with culms, 50-100 cm (20-40 in) tall, that are erect or curved at the base and flat leaf blades 2-10 mm wide. The inflorescence is reddish purple, and the spreading or nearly erect branches bear spikelets nearly to the base. The pointed glumes are 2-3 mm long and roughened on the back. Lemmas are usually awnless with some inconspicuous, short hairs at the base. The anthers are about 1 mm long.

Var. alba has an open inflorescence and leaf blades usually less than 4 mm wide. Var. stolonifera (L.) Smith also has an open inflorescence, but the leaf blades are usually wider and the plants spread by prostrate stems that root at the nodes rather than underground rhizomes. Var. palustris (Huds.) Pers. has a narrow inflorescence with nearly erect branches. All 3 varieties are very common in moist to wet meadows and stream banks as well as hay meadows in the valleys to the lower subalpine zone. Widespread in most of S. Can. and the U.S.; Europe.

Some authorities feel that this species is not native to North America, while others believe that var. stolonifera is indigenous to our area.

2. Agrostis tenuis Sibth. Common Bentgrass, Colonial Bentgrass

Common bentgrass has prostrate stems that root at the nodes and small clusters of erect stems, 20-50 cm (8-20 in) tall, from short rhizomes. The flat or folded leaf blades are 2-5 mm wide. The purplish inflorescence is open, and the spreading branches do not have spikelets near the base. The pointed glumes are 2-3 mm long, and the lemmas are pointed or short-awned with only sparse, short hairs at the base. The anthers are about 1 mm long.

This grass is used extensively in pasture seed mixtures and is infrequent in moist or wet meadow and hayfields in the valley and montane zones. Introduced from Europe and widespread in temperate North America.

Group II. These 2 species occur in dry to moist or sometimes wet, open habitats from the valleys to near or at timberline.

3. Agrostis scabra Willd. Tickle-grass

Tickle-grass is a tufted perennial with slender culms 15-60 cm (6-24 in) tall. The mostly basal leaves have flat blades that are 1-3 mm wide and usually rough to the touch. The open, purplish-tinged inflorescence may be as much as 30 cm (12 in) high with long, slender branches that bear spikelets only on the terminal portion. The pointed glumes are about 2 mm long and rough to the touch. The lemmas have a tuft of short hairs at the base and sometimes a short awn from the middle. The anthers are about 0.5 mm long.

This species is locally common in forest openings, moist meadows, ditches along roads, and disturbed areas around lakes and streams from the valley to timberline. Much of Can. and the U.S.; Asia.

4. Agrostis diegoensis Vasey Leafy Bentgrass

A tufted perennial, this plant has erect culms up to 80 cm (32 in) tall from strong rhizomes. The leaves are lax with flat blades 1-4 mm wide. The inflorescence is moderately compact and 10-15 cm (4-6 in) tall with relatively short, nearly erect branches that bear spikelets almost to the base. The pointed glumes are 2.5-3 mm long. The lemmas have a tuft of hairs at the base and are awnless or with a slender awn from the back. The anthers are about 1.5 mm long.

Leafy bentgrass is infrequent in moist or dry meadows in the valleys. B.C. to CA, east to MT, ID, and NV.

Group III. This annual species is most often found on dry, disturbed ground at lower elevations.

5. Agrostis interrupta L. Interrupted Bentgrass

Interrupted bentgrass has glabrous foliage and 1-several clustered stems up to 40 cm (16 in) tall. Leaf blades are flat or folded and 1-3 mm wide. The green inflorescence is slender and fairly congested



h. *Agropyron intermedium* i. *Agrostis alba* j. *A. tenuis* k. *A. scabra*

with short, erect branches. The glumes are about 2 mm long, and the lemmas have an awn 6-7 mm long. The anthers are about 0.5 mm long.

Typically found in disturbed soil along gravel roads in the valley and montane zones. Introduced from Europe into much of the Pacific Northwest east of the Cascades.

Group IV. These species are found in moist to wet meadows from the valleys to near timberline.

6. Agrostis thurberiana A. S. Hitchc.

Thurber's Bentgrass

This perennial bentgrass forms small tufts with culms up to 30 cm (12 in) tall from short rhizomes. The flat leaf blades are 1-3 mm wide. The narrow, elongated inflorescence is fairly open with erect or ascending branches and mostly deep purple spikelets. The pointed glumes are about 2 mm long. The lemmas have a small tuft of hairs at the base and are blunt at the tip without an awn. The anthers are about 0.5 mm long.

Thurber's bentgrass is locally common in wet meadows of the subalpine and timberline zones. AK to CA, east to Alta., MT, and CO.

7. Agrostis idahoensis Nash

Idaho Bentgrass

Idaho bentgrass is a tufted perennial with culms 10-30 cm (4-12 in) tall and weak leaves with blades that are flat or folded and about 1 mm wide. The open inflorescence has slender, spreading to ascending, flexuous branches with relatively few spikelets on the terminal half. The green or purple glumes are about 2 mm long. The lemmas are unawned and bearded at the base. The anthers are less than 0.5 mm long.

Infrequent in moist or wet meadows in the montane and subalpine zones. B.C. to CA, east to MT, CO, and NM.

8. Agrostis exarata Trin.

Spike Bentgrass

This species forms small tufts and has culms, 20-100 cm (8-40 in) tall, that are erect or curved at the base. The stems are sometimes lax and root at the nodes. The flat, weak leaf blades are 2-10 mm wide and rough to the touch. The narrow, spikelike inflorescence are green or purplish with nearly erect branches. The pointed glumes are 2-5 mm long and may have a short awn-tip about 1 mm long. The lemmas are weakly bearded at the base and awnless or with an awn up to 6 mm long. The anthers are about 0.5 mm long.

Spike bentgrass is widely scattered in moist meadows from the valleys to the subalpine zones. AK to CA, east to Alta., NE, and n. Mex.

Group V. These bentgrasses are most common near or above timberline in the Bitterroot Mountains.

9. Agrostis humilis Vasey

Alpine Bentgrass

Alpine bentgrass is a tufted perennial with culms up to 10 cm (4 in) tall and glabrous foliage. The leaf blades are flat or folded and less than 1 mm wide. The narrow, few-flowered inflorescence is purple with short, ascending branches. The pointed glumes are about 2 mm long, and the lemmas lack awns and bearding at the base. The anthers are less than 1 mm long.

Infrequent in moist to wet meadows near or above timberline in the Bitterroot Mountains. It is mostly associated with taller grasses such as Deschampsia cespitosa or Danthonia intermedia. B.C. to OR, east to Alta., MT, and CO.

10. Agrostis variabilis Rydb.

Variant Bentgrass

This perennial forms small, dense tufts with mostly basal leaves and numerous culms 8-15 cm (3-6 in) tall. The short leaf blades are flat or folded and 1-2 mm wide. The purple inflorescence is narrow and congested with short, ascending branches. The pointed glumes are 2-3 mm long, and the lemmas are sparsely short-hairy at the base and mostly awnless or with a short straight awn. The anthers are about 0.5 mm long.

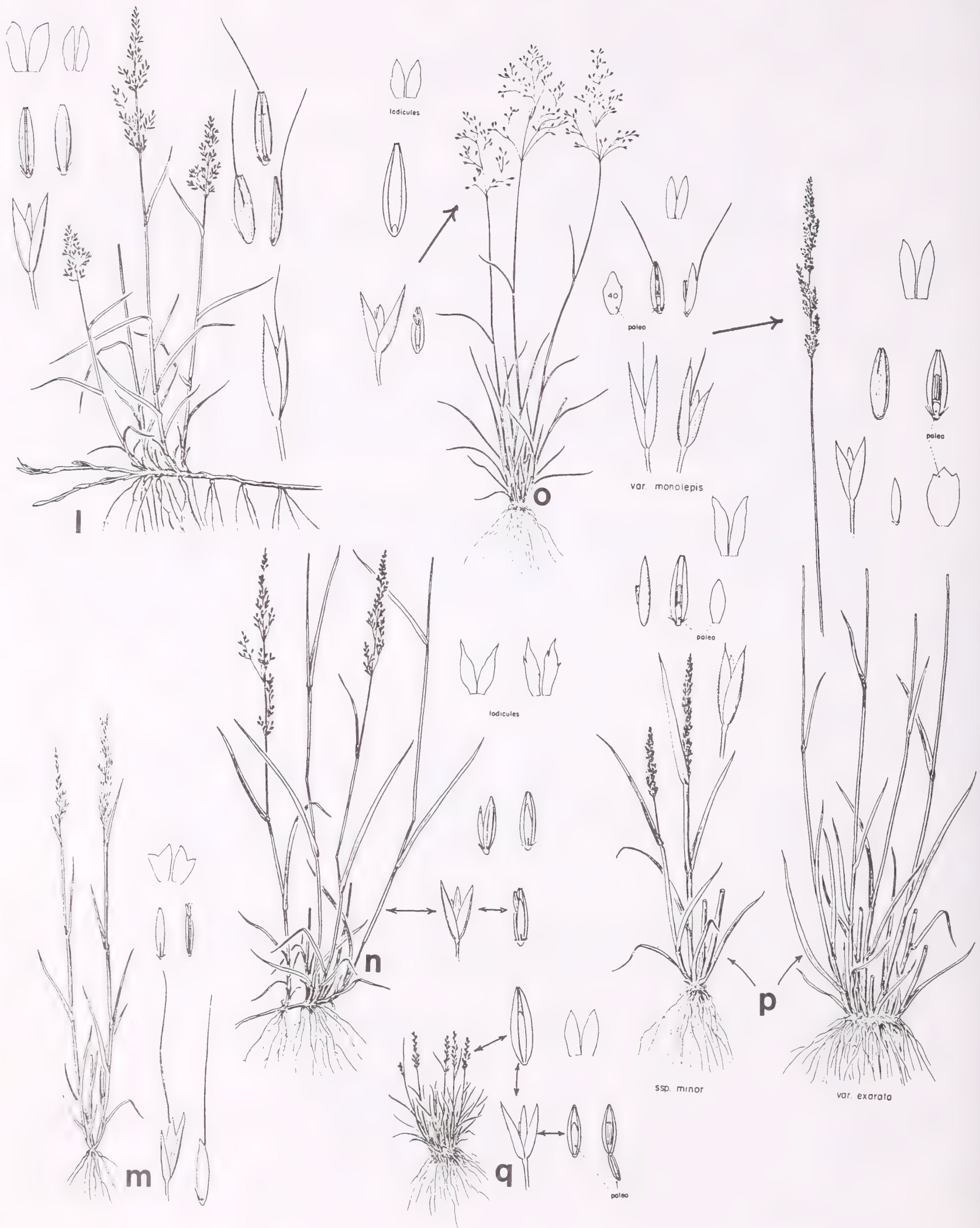
Variant bentgrass occurs scattered in open, mineral soil of slopes near or above timberline in the Bitterroot Mountains. It is more often associated with Carex and Juncus spp. than other grasses. B.C. to CA, east to Alta., MT, and CO.

11. Agrostis borealis Hartm.

Northern Bentgrass

Northern bentgrass is a tufted perennial with few culms up to 15 cm (6 in) tall and flat or folded leaf blades about 1-2 mm wide. The purplish spikelets are borne in an open inflorescence with spreading or ascending branches. The pointed glumes are 2-3 mm long, and the lemmas have a bent or straight awn about 3 mm long. The anthers are about 0.5 mm long.

This rare grass occurs on cool slopes at 2405-2775 m (7,900-9,100 ft) in the northern Bitterroot Mountains from Lolo Peak south to the Heavenly Twins west of Stevensville. AK to Newf., south to WA, CO, and NC; Europe.



l. *Agrostis diegoensis* m. *A. interrupta* n. *A. thurberiana* o. *A. idahoensis* p. *A. exarata*
 q. *Agrostis humilis*

Alopecurus L. Foxtail

Foxtails are annual or perennial grasses with leaves that have flat blades and sheaths with free margins and without auricles. The 1-flowered spikelets are borne in a congested, cylindrical, spikelike inflorescence. The glumes are about equally long and are variously covered with long or short hairs. The strongly flattened lemmas are about as long as the glumes and have a straight or bent and twisted awn arising from the lower half.

1. Glumes of largest spikelets (middle of inflorescence) 5-6 mm long; leaf blades often >5 mm wide.....(2) A. pratensis
1. Glumes usually 2-4 mm long; leaf blades mostly <5 mm wide.....2
2. Glumes long-hairy over the entire surface; inflorescence ca. 10 mm wide.....(1) A. alpinus
2. Glumes hairy only along the nerves; inflorescence usually <7 mm wide.....3
3. Annual plants of vernal moist habitats that dry by summer.....(5) A. carolinianus
3. Perennial plants mostly of more permanently moist or wet habitats.....4
4. Awn of lemmas scarcely surpassing the glumes.....(3) A. aequalis
4. Awn of lemma surpassing the glumes by at least 2 mm.....(4) A. geniculatus

Group I. These are perennials that occur in moist to wet meadows from the valleys to the subalpine zones.

1. Alopecurus alpinus J. E. Smith

Alpine Foxtail

Alpine foxtail forms tufts from short rhizomes with culms that are 20-60 cm (8-24 in) tall, and flat leaf blades that are 3-6 mm wide. The broadly cylindrical inflorescence is 20-35 mm long. The purplish-tinged glumes are 3-4 mm long with long, soft hairs over the entire surface. Lemmas have a bent awn that exceeds the glumes by about 2-3 mm.

Infrequent in subalpine meadows in the Sapphire Range. Circumboreal, south in w. North America to UT and CO.

Alpine foxtail resembles timothy (Phleum pratense), a common introduced meadow grass; however, the former has awnless glumes and awned lemmas, while the latter has awned glumes and awnless lemmas.

2. Alopecurus pratensis L.

Meadow Foxtail

This perennial forms loose tufts with culms, 30-90 cm (12-36 in) tall, that often root at the lower nodes. The leaf blades are 3-10 mm wide and rough to the touch. The spikelike inflorescence is up to 10 cm (4 in) long and slightly tapered at both ends. The glumes are about 5 mm long with long hairs on the nerves. The lemmas have a bent awn that exceeds the glumes by 2-5 mm.

Uncommon in hay meadows in the valleys. Introduced from Europe and common in much of temperate North America.

Group II. These species are often semi-aquatic, occurring on the margins of streams and lakes from the valleys to the subalpine zone.

3. Alopecurus aequalis Sobol.

Shortawn Foxtail

Shortawn foxtail is a tufted perennial (sometimes flowering the first year) with erect or spreading culms, 15-50 cm (6-20 in) tall, that often root at the lower nodes. The leaf blades are 2-5 mm wide and rough to the touch. The pale green inflorescence is 2-7 cm (1-3 in) long. Glumes are about 2 mm long with long hairs only on the nerves. The lemmas have a straight awn that barely exceeds the glumes.

Locally common in shallow standing water around streams and ponds up to the subalpine zones. Circumboreal, south in w. North America to UT and CO.

4. Alopecurus geniculatus L.

Water Foxtail

A perennial forming loose tufts, this species has culms that are curved or prostrate at the base and 30-50 cm (12-20 in) tall. The flat blades are 2-6 mm wide and rough to the touch. The pale green or purplish-tinged inflorescence is 2-7 cm (1-3 in) long. Glumes are about 3 mm long and have long hairs along the nerves. The lemmas have a bent and twisted awn, about 4-5 mm long, that evidently exceeds the glumes.

Water foxtail is infrequent in shallow water along streams and lakes from the valleys to the subalpine zone. AK to Newf., south in the west to CA and AZ; Europe.

GRAMINEAE

Group III. This group contains a single annual species found in vernal moist habitats.

5. Alopecurus carolinianus Walt.

Carolina Foxtail

Carolina foxtail forms small tufts with stems up to 20 cm (8 in) tall that are curved or nearly prostrate at the base. The leaf blades are 2-4 mm wide. The pale green inflorescence is 2-6 cm (1-2 in) long. Glumes are 2-3 mm long and hairy on the nerves. The lemmas have a bent awn exceeding the glumes by 2-3 mm.

In our area this foxtail is rare in vernal moist, often disturbed habitats in the valleys. Native to central and eastern U.S. Perhaps introduced in W. North America from B.C. and MT to OR and WY.

Aristida L. Three-awn

Aristida longiseta Steud.

Red Three-awn

[A. purpurea Nutt. var. longiseta Vasey]

Red three-awn forms dense tufts with culms 20-30 cm (8-12 in) tall and foliage that is rough to the touch. The leaves have rolled blades 1-2 mm wide and long hairs at the top of the sheaths. The 1-flowered spikelets are borne on ascending branches in an open but narrow inflorescence. The narrow, purple-tinged glumes have awned tips. The first is 7-13 mm long, about 1/2 the length of the second. The lemmas are 10-15 mm long with a 3-parted awn.

Most of our plants are var. robusta Merrill, but an undetermined variety was recently collected. In our area, this species is rare and probably often introduced, as most collections are from disturbed areas such as along railroad tracks. B.C. to N. Mex., east to ND, AZ, and TX.

Arrhenatherum Beauv. Tall Oatgrass

Arrhenatherum elatius (L.) Presl.

Tall Oatgrass

Tall oatgrass is a bunch-forming perennial with culms up to 150 cm (60 in) tall that often root at the lower nodes. The leaves have flat blades 4-8 mm wide and sheaths with free margins. The short-stalked spikelets are 2-flowered and borne in a long, narrow, open inflorescence that is purplish at first, becoming straw-colored at maturity. The lower flower usually has only stamens. The first glume is 5-7 mm long, and the second is 7-10 mm long. The lemmas have long hairs at the base, and at least one of them is awned from the back.

This introduced grass is infrequent in hay meadows and moist disturbed habitats in the valleys. Native to Europe and now widespread in North America.

Avena L. Oats

Our species are introduced annuals with flat leaf blades and sheaths that have free margins. The spikelets are 2- to 3-flowered and borne on flexuous stalks in an open, branched inflorescence. The glumes are longer than the lowest lemma. The lemmas are leathery with a bent awn arising from near the middle.

1. Each spikelet usually with only 1 awned floret.....(1) A. sativa
1. Each spikelet with 2 awned florets.....(2) A. fatua

1. Avena sativa L.

Common Oats

Common oats has glabrous foliage and culms up to 80 cm (32 in) tall. There are usually 2 florets per spikelet. The glumes are 20-25 mm long, and the lemmas have little or no hair at the base. The first floret usually has a curved or straight awn, while the second doesn't.

This plant is common in dry, disturbed soil along roads and in agricultural areas in the valleys. Widely introduced in North America.

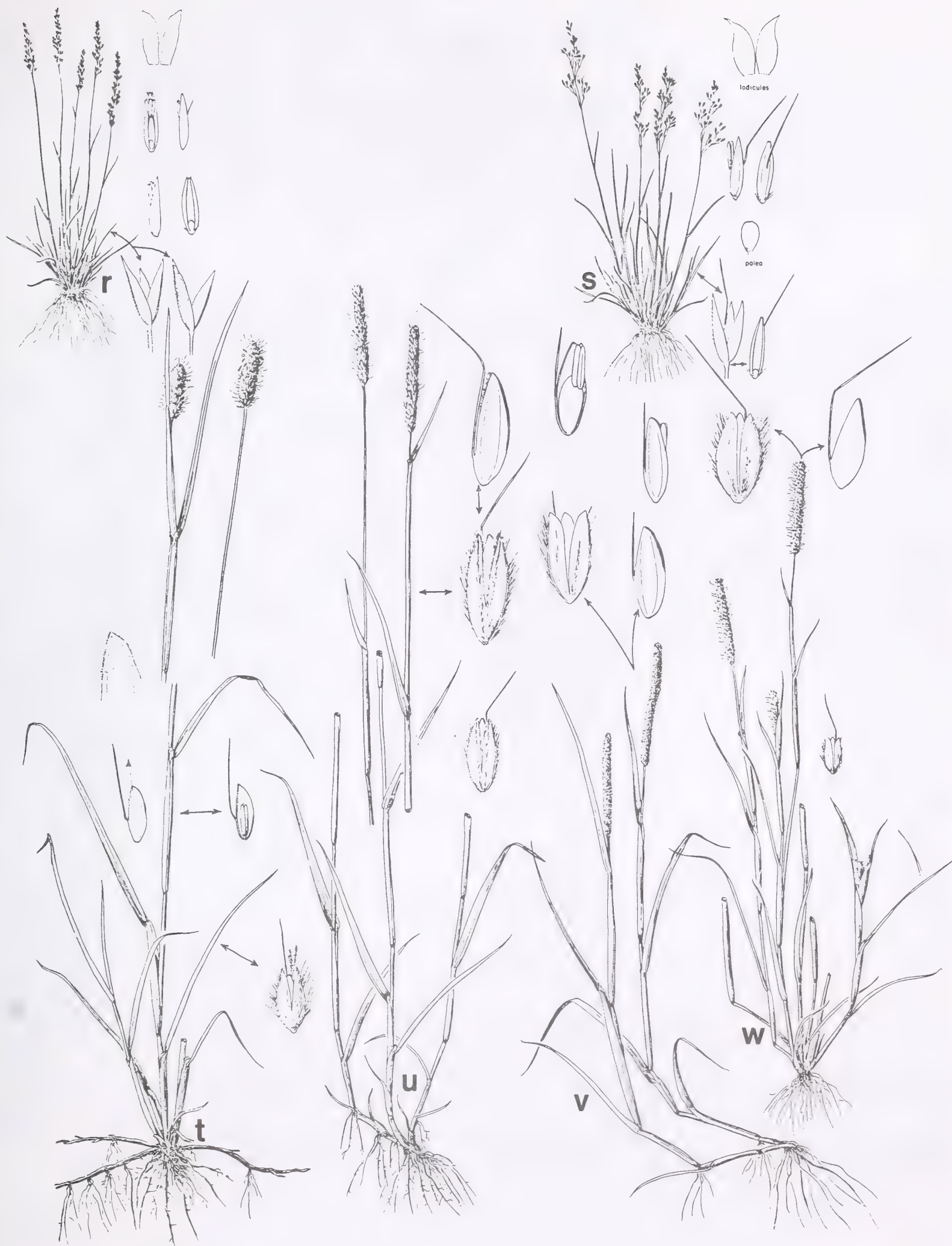
This is the cultivated oats.

2. Avena fatua L.

Wild Oats

This species has roughened or hairy foliage and culms up to 80 cm (32 in) tall. The leaf blades are 3-10 mm wide. The spikelets usually have 3 florets. Lemmas are strongly bearded at the base, and the lowest 2 florets have a twisted and bent awn up to 4 cm long.

Wild oats is common in disturbed soil of fields and roadsides in the valleys. Introduced into much of North America.



r. *Agrostis variabilis* s. *A. borealis* t. *Alopecurus alpinus* u. *A. pratensis* v. *A. aequalis*
w. *Alopecurus carolinianus*



x. *Alopecurus geniculatus* y. *Aristida longiseta* z. *Arrhenatherum elatius* a. *Avena sativa* b. *A. fatua*

Beckmannia Host SloughgrassBeckmannia syzigachne (Steud.) Fern.

Sloughgrass

Sloughgrass is a large annual with glabrous foliage and erect culms up to 100 cm (40 in) tall. The leaves have flat blades 5-10 mm wide and sheaths with free margins. The sessile, 1-flowered spikelets are borne in 2 rows in small spikes that are arranged in a narrow, congested inflorescence up to 30 cm (12 in) long. The inflated glumes and the lemmas are awnless and about 3 mm long.

This plant is common in shallow water or wet soil along rivers, streams, and ponds, often in habitats with fluctuating water tables in the valley and foothills. Much of w. and ne. U.S. and s. Can.; Asia.

Bouteloua Lag. Grama-grassBouteloua gracilis (H.B.K.) Lag.

Blue Grama

Blue grama is a mat-forming perennial with solid culms, 20-40 cm (8-16 in) tall, from short rhizomes. The leaves are mainly basal and have flat, curled blades 1-2 mm wide and sheaths with free margins. The sessile spikelets have 1 functional floret and 1-3 reduced, sterile florets. The 30-80 spikelets are tightly grouped in a 1-sided, slightly curved spike. Each culm bears 1-3 nearly horizontal to ascending purplish spikes at the top. The glumes are about 2.5 and 5.5 mm long with long hairs on the midvein. The awn-tipped fertile lemma is about 6 mm long. The first sterile lemma has an awn up to 6 mm long.

Possibly adventive populations occur around Missoula, and an apparently native population was discovered by Judy and Robert Hoy on their farm ne. of Victor. Great Plains region of s. Can., U.S. and n. Mex.

Bromus L. Brome-grass

Bromes are native or introduced, annual or perennial, usually tufted grasses. The leaves have flat blades and glabrous or hairy sheaths with joined margins. The several-flowered, stalked spikelets are flattened and borne in an open to contracted inflorescence with nearly erect to drooping branches. The pointed or blunt-tipped glumes are of unequal lengths and shorter than the lowest florets. The lemmas are often awned from the tip.

Some of the introduced annual species have come to dominate disturbed grasslands throughout the semi-arid west.

1. Plants annual, introduced and usually at least somewhat weedy.....2
1. Plants perennial.....6
2. Lemmas lobed at the tip into 2 sharply pointed teeth 2-3 mm long.....(1) B. tectorum
2. Lemmas rounded at the tip, teeth <2 mm long.....3
3. Spikelets lacking awns or awns <1 mm long.....(5) B. brizaeformis
3. Spikelets with awns mostly >2 mm.....4
4. Lemmas with bent awns.....(4) B. japonicus
4. Lemmas with straight awns.....5
5. Inflorescence narrow, the spikelets longer than the erect branches.....(2) B. mollis
5. Inflorescence more open, spikelets mostly shorter than the spreading or ascending branches.....(3) B. commutatus
6. Creeping rhizomes present, plants not forming tufts or bunches.....(6) B. inermis
6. Plants forming tufts or bunches, rhizomes lacking.....7
7. Spikelets strongly compressed, lemmas with a ridge along the back.....(7) B. carinatus
7. Spikelets more or less rounded on the back without a distinct ridge.....8
8. Lemmas evenly hairy over the entire back.....(10) B. anomalus
8. Lemmas long hairy on the margins and sometimes on the lower part of the back but with a glabrous upper portion.....9
9. Awn 3-5 mm long; ligule ca. 1 mm long; lemmas broad.....(8) B. ciliatus
9. Awn mostly >5 mm long; ligule 3-5 mm long; lemmas narrow.....(9) B. vulgaris

GRAMINEAE

Group I. Members of this group are introduced annuals occurring in the valleys and foothills.

1. Bromus tectorum L.

Cheatgrass

Cheatgrass forms small tufts with soft-hairy foliage and mostly erect culms 20-50 cm (8-20 in) tall. The flat blades are 2-3 mm wide. The 3- to 6-flowered spikelets are borne on the ends of long, spreading stalks in an open inflorescence. The narrow glumes are glabrous or hairy and less than 10 mm long. The sharp-pointed lemmas have a straight or slightly bent awn 10-15 mm long.

Cheatgrass is common in dry grasslands in the valleys and foothills. Introduced from Eurasia and widespread in temperate North America, especially in the west.

Light green and palatable in the spring, this species cures early, turning reddish purple and unpalatable in early summer, coloring whole hillsides and indicating where overgrazing or other disturbances have occurred.

2. Bromus mollis L.

Soft Brome

Soft brome forms loose tufts with culms 20-50 cm (8-20 in) tall and long-hairy foliage. The leaf blades are flat and 1-3 mm wide. The glabrous, 5- to 7-flowered spikelets are borne on short, nearly erect branches of the narrow and contracted inflorescence. The lance-shaped glumes are 4-8 mm long. The broadly lance-shaped lemmas are 6-9 mm long with a straight awn 6-10 mm long.

This annual brome is locally common in disturbed soil of dry grassland in the foothills. Introduced from Europe and common in temperate North America, especially in the west.

3. Bromus commutatus Schrad.

Meadow Brome

Meadow brome has soft-hairy foliage and culms up to 90 cm (36 in) tall. The flat blades are long-hairy and 2-5 mm wide. The glabrous or sparsely hairy, 5- to 9-flowered spikelets are borne on long, loosely ascending stalks in an open inflorescence. The lance-shaped glumes are 5-9 mm long. Lemmas are 9-10 mm long with a straight or slightly bent awn 4-10 mm long.

Meadow brome is infrequent on roadsides, in disturbed fields, and in the moist meadows along the Bitterroot River. Native to Europe, introduced in most of temperate North America.

4. Bromus japonicus Thunb.

Japanese Brome

This grass is similar to B. tectorum in vegetative characters and has an open inflorescence with spreading or drooping branches. The glabrous spikelets are 7- to 12-flowered. The lance-shaped glumes are 4-8 mm long. The broadly lance-shaped lemmas have a blunt or rounded tip with a slightly bent awn 8-12 mm long.

Japanese brome is rare in our area but seems to persist near the old railroad station at the north end of Missoula. Introduced from Eurasia into most of temperate North America.

5. Bromus brizaeformis Fisch. & Mey.

Rattle-grass, Rattlesnake Grass

Rattle-grass has glabrous culms up to 60 cm (24 in) tall. The leaves have densely hairy sheaths and short-hairy blades that are 2-5 mm wide. The 7- to 11-flowered, glabrous, and strongly compressed spikelets are borne singly on the ends of long, arching stalks that are bent mostly to one side of the open inflorescence. The broadly lance-shaped glumes are 4-9 mm long. The inflated lemmas are 9-11 mm long without awns or with a short awn-tip.

Rare in dry grasslands in the foothills. Introduced from Europe into much of the U.S. and s. Can.

An attractive grass, often gathered for dry flower arrangements.

Group II. This species is a strongly rhizomatous perennial.

6. Bromus inermis Leys.

Smooth Brome, Hungarian Brome

[B. pumpellianus Scribn.]

Smooth brome has glabrous to short-hairy foliage and culms up to 120 cm (48 in) tall. The flat leaf blades are 3-10 mm wide. Numerous narrow, 5- to 13-flowered spikelets are borne on ascending branches in a narrow to somewhat open inflorescence. The purplish-tinged glumes are 4-10 mm long and glabrous or hairy. The lemmas have an awn-tip or a short awn up to 2 mm long.

Ssp. inermis has glabrous lemmas and culms and greenish spikelets. It is introduced from Europe as a pasture grass and is common in mesic, open, disturbed habitats such as roadside ditches, low areas of pastures, and margins of irrigated fields. This subspecies is widespread in much of the w. and ne. U.S. and adjacent Can. Ssp. pumpellianus (Scribn.) Wagnon has hairy lemmas and culm nodes and purplish spikelets. This native subspecies is infrequent in moist montane or subalpine meadows in the Sapphire Range. AK to CO.



c. *Beckmannia syzigachne* d. *Bouteloua gracilis* e. *Bromus tectorum* f. *B. mollis*



g. *Bromus commutatus* h. *B. japonicus* i. *B. brizaeformis* j. *B. inermis*

Group III. These species are bunch-forming perennials without rhizomes.

7. Bromus carinatus Hook. & Arn.

California Brome, Keeled Brome

This species has glabrous or hairy foliage and culms 30-100 cm (12-40 in) tall. The leaf blades are flat or slightly rolled and 3-12 mm wide. The strongly compressed, 5- to 10-flowered spikelets are borne on mostly erect or ascending branches of the rather narrow inflorescence. The glumes are lance-shaped, the first 5-9 mm long and the second nearly twice as long. The lemmas have a straight awn 3-15 mm long.

Var. carinatus has hairy culms and leaves mostly less than 5 mm wide. It is common in moist grasslands, woodlands, and forest openings in the valleys to the lower subalpine zone. Var. linearis Shear has mostly glabrous culms and some leaves greater than 5 mm wide. It is infrequent in moist, open or partially shaded habitats in the valleys. AK to Baja Cal., east to Alta., SD, CO, and NM.

8. Bromus ciliatus L.

Fringed Brome

Fringed brome has culms, 50-100 cm (20-40 in) tall, that are usually hairy at the nodes. The leaves have flat blades that are 5-10 mm wide and glabrous to densely hairy sheaths. The 7- to 9-flowered spikelets are borne on long, spreading or drooping branches of the open inflorescence. The glumes are 5-8 mm long. Lemmas are 8-13 mm long with a straight awn 3-4 mm long and long hairs at least on the margins.

Uncommon in moist to seasonally dry, open or densely shaded habitats in the valley and montane zones. B.C. to Baja Cal., east to Newf., NJ, MO, TX, and n. Mex.

B. ciliatus and B. vulgaris are our common bromes of open and closed forests. They often occur in the same habitat and are easily confused.

9. Bromus vulgaris (Hook.) Shear

Columbia Brome

Columbia brome is similar to B. ciliatus with culms, 60-100 cm (24-40 in) tall, that are usually hairy at the nodes. The leaves have flat blades 5-10 mm wide and glabrous to densely hairy sheaths. The 5- to 7-flowered spikelets are borne on drooping branches of the open inflorescence. The glumes are 5-10 mm long. The lemmas are 8-13 mm long with a 3-8 mm awn and long hair, at least on the margins.

Infrequent in moist, open or shaded habitats from the valley to the lower subalpine zone. B.C. to CA, east to Alta., MT, and WY.

10. Bromus anomalus Rupr.

Nodding Brome

Nodding brome has glabrous to sparsely hairy foliage and culms 30-100 cm (12-40 in) tall. The stiff leaf blades are flat or slightly rolled and 3-5 mm wide. Relatively few 7- to 11-flowered spikelets are borne on drooping branches in the open inflorescence. The short-hairy glumes are 5-11 mm long. The hairy lemmas are 10-13 mm long with 2-3 mm awn.

Infrequent in our area, this brome occurs in dry to moist meadows in the valleys. Alta. and Sask., south to SD, n. Mex., and CA.

Calamagrostis Adans. Reedgrass

Members of this genus are sturdy, rhizomatous, perennial grasses with leaf sheaths that are open along the margins. The small, 1-flowered spikelets are borne in open to narrow, spikelike inflorescences. The glumes are about equally long and mostly longer than the lemmas. The lemmas have bent or straight awns and tufts of long straight hair at the base.

- | | | |
|----|---|----------------------------|
| 1. | Awn of the lemma bent..... | 2 |
| 1. | Awn of the lemma straight..... | 4 |
| 2. | Awn not exerted beyond the glumes; plants of grasslands in the valleys and foothills..... | (5) <u>C. montanensis</u> |
| 2. | Awn exerted beyond the glumes; plants of forest or timberline habitats..... | 3 |
| 3. | Awn usually exerted <1.5 mm beyond the glumes; top of leaf sheaths with a ring of long hairs..... | (4) <u>C. rubescens</u> |
| 3. | Awn often exerted >1.5 mm beyond glumes; top of leaf sheath without long hairs.... | (6) <u>C. purpurascens</u> |
| 4. | Hairs at the base of the lemma ca. as long as lemma; branches of the inflorescence usually spreading..... | (1) <u>C. canadensis</u> |
| 4. | Hairs at the base of the lemma <3/4 as long as lemma; branches of the inflorescence nearly erect..... | 5 |
| 5. | Appendage at the juncture of blade and sheath (ligule) >4 mm long..... | (2) <u>C. inexpansa</u> |
| 5. | Ligule <4 mm long..... | (3) <u>C. neglecta</u> |



k. *Bromus carinatus* I. *B. ciliatus* m. *B. vulgaris*

Group I. These reedgrasses occur mainly in perennially moist or wet habitats such as meadows, swamps, willow thickets, and the margins of ditches, ponds, or streams.

1. Calamagrostis canadensis (Michx.) Beauv.

Bluejoint Reedgrass

Bluejoint reedgrass is strongly rhizomatous with erect culms up to 150 cm (60 in) tall and flat leaf blades, 3-8 mm wide, that are a distinctive dull blue-green. The leaf sheaths are glabrous or roughened and densely hairy at the top. Spikelets are borne on nearly erect to spreading branches in an open to narrow inflorescence. The mostly purplish glumes are 3-6 mm long. The papery lemmas have a straight awn about as long as the glumes and basal hairs nearly as long.

Var. canadensis has glumes less than 4.5 mm long and the awn arises from the lower 2/3 of the lemma. It is common in wet areas from the valleys to the subalpine zones, often dominating extensive areas. Var. pallida (Vasey & Scribn.) Stebbins also has glumes less than 4.5 mm long, but the awn arises from the tip of the lemma, and the inflorescence is narrow with erect branches. It occurs in the Bitterroot Mountains, from 2375-2560 m (7,800-8,400 ft). Var. scabra (Kunth) A.S. Hitch. has an open inflorescence and glumes that are 5-6 mm long. It is infrequent in the montane and lower subalpine zones in the northern Bitterroot Mountains. Common in most all of temperate and boreal North America.

2. Calamagrostis inexpansa Gray

Northern Reedgrass

This reedgrass has tufted culms that are rough to the touch and up to 120 cm (48 in) tall. The leaves have glabrous sheaths, and the rolled blades are wiry and 2-4 mm wide. The pale green and often purple-tinged spikelets are borne on nearly erect branches of the crowded, narrow inflorescence. Glumes are 3-4 mm long. The lemmas have a tuft of hair at the base about 2/3 their length and are awned from below the middle, the awn about as long as the glumes.

Northern reedgrass is locally common in moist or wet meadows, marshes, and forest openings from the valleys to the subalpine zones. AK to CA, east to Newf., VA, and NM.

This species is very similar to C. neglecta, but can be distinguished by the ligule of the upper leaves that is greater than 4 mm long. C. neglecta is generally a smaller plant with narrower leaves.

3. Calamagrostis neglecta (Ehrh.) Gaertn.

Slim Reedgrass

[C. stricta (Timm) Koeler]

Slim reedgrass has glabrous culms up to 60 cm (24 in). The leaves have smooth sheaths and flat or rolled blades 1-3 mm wide. Spikelets are borne on nearly erect branches in a narrow inflorescence. The glumes are about 3 mm long. The lemmas have a tuft of long, straight hairs at the base and are awned from near the middle, the straight awn about equal to the lemma.

Collected in wet habitats in the floodplain of the Bitterroot River. Circumboreal south in w. North America to OR, NV, UT, CO, and ND.

Group II. The species in this group occur in dry habitats, either open or shaded.

4. Calamagrostis rubescens Buckl.

Pinegrass

Pinegrass has mostly tufted culms up to 100 cm (40 in) tall. The characteristic bright green leaves have mostly flat blades 2-4 mm wide and sheaths with sparse, long hairs around the top. The pale green and purplish spikelets are borne on nearly erect branches of the narrow inflorescence. The pointed glumes are 4-5 mm long. The papery lemmas have a bent awn that surpasses the glumes and a sparse tuft of hairs about 1 mm long at the base.

Common in mesic to dry forests and forest openings from the valleys to the subalpine zones. B.C. to CA, east to Alta. and CO.

Although this is one of most common grasses, often growing in extensive swards in coniferous forests, it rarely blooms except after removal of the forest canopy. It is an indicator species of the drier Douglas fir and subalpine fir habitat types. The long hairs around the leaf sheath collars are a good vegetative field character.

5. Calamagrostis montanensis (Scribn.) Scribn.

Prairie Reedgrass

This strongly rhizomatous species has glabrous, erect culms 15-40 cm (6-16 in) tall. The mostly basal leaves have smooth sheaths and strongly rolled blades 1-3 mm wide. The light green and purplish-tinged spikelets are borne on short, erect branches of the narrow, congested inflorescence. The sharp-pointed glumes are 4-5 mm long. The lemmas have a tuft of long hairs at the base and a bent awn that protrudes out between the glumes.

Prairie reedgrass is infrequent in dry native grasslands in the valleys and foothills, especially on the east side of the Bitterroot Valley. B.C. to MN, south to CO. and SD.

6. Calamagrostis purpurascens R. Br.

Purple Reedgrass

Purple reedgrass forms tufts with culms, 15-60 cm (6-24 in) tall, from short rhizomes. The leaves have stiff, rolled leaves 2-4 mm wide and sheaths that are glabrous or rough to the touch. The old leaf

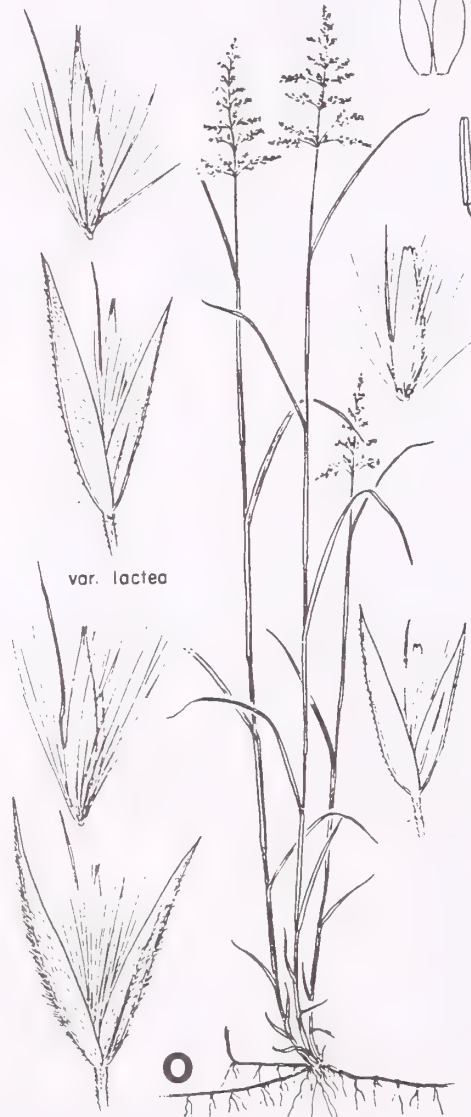


n



• var. pallida

var. robusta



o

var. lactea

• var. scabra

• var. canadensis



p

var. inexpansa

var. barbulata

n. *Bromus anomalus* o. *Calamagrostis canadensis* p. *C. inexpansa*

bases are typically persistent at the base of the plants. The purplish-tinged spikelets are borne on short, erect branches of the narrow, congested inflorescence. Glumes are 5-8 mm long. The lemmas have a bent awn longer than the glumes and a tuft of long hairs, 1-2 mm long, at the base.

Most common in shallow mineral soil on exposed ridges near or above timberline. Large plants can occasionally be found in open habitats in the montane zone. AK to CA, east to CO, SD, MN, and Que.; Greenl. and Asia.

Catabrosa Beauv. Brookgrass

Catabrosa aquatica (L.) Beauv.

Brookgrass

Brookgrass is a rhizomatous perennial with culms, 10-60 cm (4-24 in) tall, that are erect or curved at the base. The leaves have sheaths with free margins above and flat blades 2-13 mm wide. The (1)2-flowered spikelets are borne on short and long, spreading branches of the open inflorescence. The glumes are about 1-2 mm long with blunt, wavy tips. The lemmas are 2-3 mm long with blunt, wavy tips.

Rare in our area, found in quiet waters of springs and seep areas in the valley and montane zones. Alta. to Newf., south to OR, AZ, IA, and WI; Europe.

Cinna L. Woodreed

Cinna latifolia (Trevir.) Griseb.

Woodreed

Woodreed is a tall, rhizomatous perennial with culms up to 150 cm (60 in) tall and mostly glabrous foliage. The leaves have flat blades 7-15 mm wide and sheaths with free margins. The 1-flowered spikelets are borne towards the ends of spreading or nodding branches of the open inflorescence. The slender glumes are nearly equal and 3-4 mm long. The lemmas are strongly compressed and about 2-3 mm long with or without a short awn.

This plant is common in moist, usually shaded, forest habitats from the valley to the lower subalpine zone. AK to CA, east to Newf. and NC.

Cynosurus L. Dogtail

Cynosurus cristatus L.

Crested Dogtail

This introduced perennial grass forms small tufts with culms 30-70 cm (12-28 in) tall and mostly glabrous foliage. The leaves have flat or folded blades about 2 mm wide and sheaths with free margins. The spikelets are of 2 kinds: fertile with 2-3 florets and sterile with 2 glumes and several empty lemmas. They are borne in pairs of 1 each on very short, erect branches of the congested, spikelike inflorescence. Glumes of the fertile florets are about 3 mm long with a prominent ridge on the back. The lemmas are about 4 mm long with a short awn-tip.

Crested dogtail occurs below a seep area at Sleeping Child Hot Springs southeast of Hamilton. Native of Europe, widely introduced in N. U.S. and s. Can.

Dactylis L. Orchard Grass

Dactylis glomerata L.

Orchard Grass

Orchard grass has glabrous foliage and forms tufts with culms up to 100 cm (40 in) tall from short rhizomes. The leaves have roughened, flat blades 3-11 mm wide and sheaths with united margins. The early season's growth is light bluish-green. The 3- to 5-flowered spikelets are borne in congested heads at the ends of mostly stiffly erect or ascending branches of the inflorescence. Glumes are 4-6 mm long with a soft awn-tip, and the outer one is hairy toward the top. The hairy lemmas are 5-8 mm long with a 1 mm awn-tip.

An introduced pasture grass, it is widespread in mesic, disturbed habitats such as roadsides and hay meadows in the valley and montane zones. Native of Eurasia, common in much of temperate North America.

Danthonia Lam. & DC. Oatgrass

Members of this genus are tufted native perennials with narrow leaf blades and sheaths with free margins and a ring of short hairs around the top. The large, several-flowered spikelets are borne singly or in small groups at the ends of ascending or spreading branches of the small, open inflorescence. The glumes are equal to or longer than the florets. The lemmas have a tufts of hairs at the base, 2 sharp-pointed lobes at the tip, and a twisted and bent awn.



q. *Calamagrostis neglecta* r. *C. rubescens* s. *C. montanensis* t. *C. purpurascens* u. *Catabrosa aquatica*

1. Inflorescence with usually only 1(2-3) spikelet.....(2) D. unispicata
1. Inflorescence with >3 spikelets.....2
2. Lemmas short hairy over the entire back as well as along the margins.....(3) D. spicata
2. Lemmas hairy only on the margins and at the base.....3
3. Branches of the inflorescence erect or nearly so.....(1) D. intermedia
3. Branches of the inflorescence spreading.....(4) D. californica

1. Danthonia intermedia Vasey

Timber Oatgrass

Timber oatgrass is strongly tufted with culms 5-30 cm (2-12 in) tall and old withered leaves persistent at the base. The leaves have flat or rolled blades 1-3 mm wide and mostly glabrous sheaths with a ring of long, stiff hairs around the top. Few to several spikelets are borne singly at the tips of nearly erect branches of the narrow inflorescence. Glumes are 13-17 mm long. The lemmas are 7-10 mm long with long hairs at the base and along the margins and a bent awn up to 10 mm long.

Common in high montane to alpine meadows. AK to CA, east to Newf., MI, and NM.

Timber oatgrass may be a dominant member of some meadow communities, and it is the only member of the genus to form large populations in our area.

2. Danthonia unispicata (Thurb.) Munro

One-spike Oatgrass

This grass forms small tufts with culms up to 30 cm (12 in) and mostly long-hairy foliage. The leaf sheaths have long, stiff hairs around the top. The single or occasionally 2-3 spikelets are borne at the end of the single inflorescence branch. Glumes are 14-23 mm long. The lemmas are bearded at the base and long hairy along the margins. They are 9-12 mm long with a somewhat bent awn.

One-spike oatgrass is infrequent in dry, shallow soil, often on ridges and cliffs from the foothills to the lower subalpine zone. B.C. to CA, east to Alta. and CO.

The long-hairy foliage and the mostly single-spike inflorescence are distinctive.

3. Danthonia spicata (L.) Beauv.

Common Wild Oatgrass, Poverty Oatgrass

Common wild oatgrass forms bunches and has culms 20-40 cm (8-16 in) tall with old, withered leaves at the base. The leaves have short, often curled, rolled blades 1-2 mm wide and glabrous or hairy sheaths with long hairs at the top. Mostly solitary spikelets are borne on the ends of few, short, nearly erect branches of the narrow inflorescence. The slender glumes are 9-12 mm long. The lemmas are 4-5 mm long and sparsely short-hairy over the back with a bent awn up to 9 mm long.

Uncommon in open, dry, ponderosa pine stands and moist meadows at low elevations. AK to Newf., south to most of the U.S.

4. Danthonia californica Boland

California Oatgrass

California oatgrass forms tufts, and the culms are 30-70 cm (12-28 in) tall. The leaves have flat or rolled blades that are 1-3 mm wide and glabrous to densely short-hairy sheaths with long, straight hairs at the throat. The spikelets are solitary at the ends of long, spreading branches of the open inflorescence. Glumes are 14-18 mm long. The lemmas are up to 14 mm long with short hairs at the base and on the margins, long, pointed teeth at the tip, and a bent awn.

California oatgrass is uncommon in open, dry, ponderosa pine stands at low elevations. B.C. to CA, east to MT and NM; Chile.

Deschampsia Beauv. Hairgrass

Members of this genus are tufted perennial or annual grasses with flat or rolled blades and leaf sheaths that are open along the margins. The spikelets are mostly 2-flowered and borne on spreading to erect branches of narrow or open inflorescences. Glumes are mostly of unequal length and longer than the lower floret. The lemmas are toothed at the tip and have long hairs at the base and a straight or bent awn attached about the middle of the back.

1. Leaf blades 3-6 mm wide, flat with a prowlike tip.....(2) D. atropurpurea
1. Leaf blades rolled and mostly <3 mm wide.....2
2. Plants annual without a well-developed root system.....(4) D. danthonioides
2. Plants perennial.....3
3. Inflorescence narrow, branches nearly erect.....(3) D. elongata
3. Inflorescence open, branches spreading or drooping.....(1) D. cespitosa



v. *Cinna latifolia* w. *Cynosurus cristatus* x. *Dactylis glomerata* y. *Danthonia intermedia* z. *D. unispicata*

Group I. These are perennial species.

1. Deschampsia cespitosa (L.) Beauv.

Tufted Hairgrass

Tufted hairgrass is a bunch-forming perennial with numerous culms up to 50 cm (20 in) tall. The leaves have stiff, mostly rolled blades 1-3 mm wide and glabrous or roughened sheaths. The shiny, purplish-brown spikelets are borne on spreading or drooping branches of the open inflorescence. The narrow glumes are about 3-6 mm long. Lemmas are 2-4 mm long with a tuft of hair about 1 mm long at the base and a straight or slightly bent awn, 2-4 mm long, arising from near the base.

Occurs in moist or wet meadows. It is rare in the valleys but becomes more common with increasing elevation, and may be dominant around lakes and on rocky summits near or above timberline in the Bitterroot Mountains. Circumboreal, south in w. North America to CA and NM.

2. Deschampsia atropurpurea (Wahl.) Scheele

Mountain Hairgrass

This species forms small tufts with glabrous or sparsely hairy foliage and 1-several culms 15-30 cm (6-12 in) tall. The flat leaf blades are short and 4-6 mm wide with prowlike tips. The dark purple, often nodding spikelets are borne on ascending or spreading branches of the open or somewhat contracted inflorescence. The narrowly elliptical glumes are about 5 mm long. Lemmas are 2-3 mm long with hairs about 1 mm long at the base and a slightly bent awn arising from the middle of the back.

Common in openings and margins of spruce-fir forest from the subalpine zone to above timberline. In the Bitterroot Mountains, it is always present on the cool north and east slopes where moisture remains throughout the summer. Circumboreal, south in w. North America to CA and CO.

3. Deschampsia elongata (Hook.) Munro

Slender Hairgrass

Slender hairgrass forms small, dense bunches with slender culms 30-80 cm (12-32 in) tall. The leaves have flat or folded blades, 1-2 mm wide, and glabrous sheaths. The pale green or purplish spikelets are borne on nearly erect branches of the narrow inflorescence. The glumes are 3-6 mm long, exceeding the uppermost floret. The smooth, shiny lemmas are 2-3 mm long with hairs about 1 mm long at the base and a nearly straight awn 3-4 mm long.

Locally common in open, moist or wet habitats from valley floodplains to subalpine lake shores. AK south to CA, NM, and n. Mex.; South America.

Group II. This is our only annual hairgrass.

4. Deschampsia danthonioides (Trin.) Munro

Annual Hairgrass

The plant has solitary or several tufted culms 5-50 cm (2-20 in) tall and glabrous foliage. The leaf blades are rolled and about 1 mm wide. Spikelets are borne at the ends of ascending branches of the narrow, open inflorescence. The glumes are 5-8 mm long. The smooth, shiny, often purplish lemmas are 2-3 mm long and densely hairy at the base with a bent awn about 5 mm long.

Annual hairgrass occurs in open, dry or vernal moist habitats such as along roads and banks from the valleys to the lower subalpine zone. AK to Baja Cal., east to MT, UT, and AZ; Chile.

Digitaria Heister Crabgrass

Our species are introduced annuals with erect or prostrate stems that tend to root at the nodes. The leaves have flat blades and sheaths with free margins. The 2-flowered, sessile spikelets are borne on 1 side of the 3-angled, spokelike branches of the inflorescence that radiate from the top of the culm. Each spikelet has only 1 fertile floret and 1 well-developed glume. The fertile lemma and palea are hardened.

Both of these species have been repeatedly observed on the University of Montana Campus; however, neither seems to be established there or perhaps anywhere else in western Montana.

- 1. Leaf sheaths nearly glabrous.....(1) D. ischaemum
- 1. Leaf sheaths densely long-hairy.....(2) D. sanguinalis

1. Digitaria ischaemum (Schreb.) Schreb.

Smooth Crabgrass

Smooth crabgrass has glabrous foliage and leaf blades 2-4 mm wide. The inflorescence has 3-6 branches. The second glume is about 2 mm long, equal to the fertile floret. The first glume is minute or lacking.

Introduced from s. Can. south to South America.



a. *Danthonia spicata* b. *D. californica* c. *Deschampsia cespitosa* d. *D. atropurpurea*

2. Digitaria sanguinalis (L.) Scop.

Hairy Crabgrass

This crabgrass has leaves with long-hairy sheaths and flat blades 4-6 mm wide. The inflorescence has numerous branches in 2-3 whorls. The second glume is about 2 mm long with hair on the margins. The lemmas are about 3 mm long.

Native to Europe, established in most of the U.S. and s. Can.

Distichlis Raf. SaltgrassDistichlis stricta (Torr.) Rydb.

Alkali Saltgrass

Alkali saltgrass is a rhizomatous perennial with solid culms up to 30 cm (12 in) tall that are often prostrate at the base and rooting at the nodes. The leaves have glabrous sheaths and rolled blades 2-4 mm wide. The 5- to 16-flowered spikelets are borne on short, erect branches of the compact inflorescence. Male and female flowers are borne on separate plants, the compressed male spikelets are yellowish and have more florets. The unequal glumes are about 3-4 and 5 mm long. The papery lemmas are about 6 mm long.

Collected in a moist meadow south of Florence in the Bitterroot Valley. B.C. to Baja Cal., east to Sask., MO, and TX.

This grass is nearly unpalatable.

Echinochloa Beauv. Barnyard GrassEchinochloa crus-galli (L.) Beauv.

Barnyard Grass

Barnyard grass is an annual with solid or hollow culms up to 150 cm (60 in) tall that are erect or curved at the base. The leaves have flat blades 4-16 mm wide and sheaths with free margins. The nearly sessile, 2-flowered spikelets are borne in several dense spikes, about 3 cm long, that spread at ascending angles from the axis of the inflorescence. Each spikelet has a sterile flower and an upper fertile one. The first glume is greatly reduced, and the second is about as long as the sterile lemma. The sterile lemma is 3-4 mm with an awn up to 30 mm long. The fertile lemma is unawned.

This weedy species is locally common along ditches and in well-irrigated fields. Native to the tropics, it is established in most of U.S. and s. Can.

Elymus L. Wild Rye, Ryegrass

The ryegrasses are bunch-forming or rhizomatous perennials (ours) with hollow culms and leaf sheaths with free margins. The inflorescence is a terminal spike with 2 spikelets per node. The spikelets have 2-6 florets, and the narrow glumes sometimes have a short awn and are nearly equal in length. The lemmas are rounded on the back, with or without awns.

In addition to the following species, Elymus macounii Vasey, a sterile hybrid between Hordeum jubatum and Agropyron caninum, may occur in our area.

- | | | | |
|----|---|-----|-----------------------|
| 1. | Spikelets usually >2 per node of the spike; ligules at least 2 mm long..... | (2) | <u>E. cinereus</u> |
| 1. | Spikelets mostly 2 per node; ligules <2 mm long..... | | 2 |
| 2. | Plant strongly rhizomatous..... | (4) | <u>E. triticoides</u> |
| 2. | Plants forming tufts, not strongly rhizomatous..... | | 3 |
| 3. | Awns spreading, spike arched or nodding at the tip..... | (3) | <u>E. canadensis</u> |
| 3. | Awns (if present) straight, spike erect or nearly so..... | (1) | <u>E. glaucus</u> |

1. Elymus glaucus Buckl.

Blue Wild Rye

Blue wild rye forms small tufts with culms 30-100 cm (12-40 in) tall and glabrous or hairy foliage. The leaves have flat blades mostly 5-10 mm wide and sheaths that are often purple at the top. The somewhat congested spike is 5-15 cm long and erect or slightly nodding with 2 spikelets per node. There are 3-5 florets per spikelet. The narrowly lance-shaped glumes are pointed or awn-tipped. The lemmas are glabrous and usually have a straight awn 1-2 cm long.

Common in small populations from the valleys to partial shade of subalpine forests. AK to CA, east to Ont., MI, CO, and NM.

2. Elymus cinereus Scribner & Merrill

Great Basin Wild Rye, Giant Wild Rye

This ryegrass forms large clumps with culms up to 200 cm (80 in) tall and glabrous to finely hairy foliage. The leaf blades are flat and up to 20 mm wide. The densely flowered spike may be as much as 25 cm (10 in) long with usually 3 or more spikelets per node. The glumes are 10-20 mm long, nearly as long



e. *Deschampsia elongata* f. *D. danthonoides* g. *Digitaria ischaemum* h. *D. sanguinalis*



i. *Distichlis stricta* j. *Echinochloa crusgalli* k. *Elymus glaucus* l. *E. cinereus*

GRAMINEAE

as the spikelet. The glabrous or short-hairy lemmas are 10-15 mm long and usually with an awn-tip or an awn 2-7 mm long.

In our area, giant wild rye is locally common in deep, moist but well-drained soil on the floodplains of the rivers. B.C. to CA, east to Alta., MN, CO, and NM.

3. Elymus canadensis L.

Canada Wild Rye

Canada wild rye forms small clumps and has culms up to 150 cm (60 in) tall. The leaves have flat blades 7-15 mm wide and mostly glabrous sheaths. The spike is 10-20 cm long with the tip bent or drooping. The upper spikelets are crowded, while the lower are more widely spaced. The almost cylindrical glumes have a slender, spreading awn. The awned lemmas are 10-15 mm long and rough to the touch.

This ryegrass is locally common in moist soil of open to partially shaded habitats in the valley and montane zones. AK to CA, east to Que. and NC.

The spike of Canada wild rye resembles an ear of cultivated rye. This species may be very common in areas where it has been seeded in with other grasses to prevent erosion after timber harvest or fire.

4. Elymus triticoides Buckl.

Creeping Wild Rye

This species is strongly rhizomatous and has culms 60-100 cm tall and foliage covered with a thin, bluish, waxy coating. The leaves have flat or rolled blades 3-6 mm wide and glabrous or hairy sheaths. The spikelets are mostly 2 per node; the upper somewhat crowded, while the lower are more widely spaced. The narrow glumes are up to 13 mm long and often have an awn-tip. The glabrous lemmas are 7-12 mm long and with an awn-tip but usually without a true awn.

Creeping wild rye was collected once just above the high water line at Como Lake southwest of Hamilton. WA to Baja Cal., east to MT, CO, and NM.

Eragrostis Beauv. Lovegrass, Stinkgrass

The members of this genus in our area are introduced annuals with leaf sheaths that have free margins and a fringe of hair at the top. The several- to many-flowered spikelets are borne on the spreading or ascending branches of the open or contracted inflorescence. Glumes are shorter than the lemmas, and both glumes and lemmas are awnless. The florets overlap each other closely in the spikelet.

1. Foliage hairy and covered with depressed glands.....(1) E. cilianensis
1. Foliage non-glandular and mostly glabrous.....(2) E. pectinacea

1. Eragrostis cilianensis (Allioni) Mosher

Stinkgrass

Stinkgrass has glandular, ill-smelling foliage and culms, 10-35 cm (4-14 in) tall, that are erect or curved at the base. The leaves have flat or folded blades 2-5 mm wide and sheaths that are hairy as well as glandular. The open inflorescence is broadest at the bottom and tapered upward. The glumes are about 2 mm long and nearly equal in length. The lemmas are prominently nerved.

This weedy grass has been collected around buildings and walkways on the north side of Missoula. Native to Eurasia and introduced in much of the U.S.

Plants seem to thrive in areas where concrete provides reflected heat.

2. Eragrostis pectinacea (Michx.) Nees

Purple Lovegrass

Lovegrass has several culms up to 50 cm tall that are erect or curved at the base. The leaves have flat or folded blades 1-3 mm wide and sheaths that are glabrous except for the ring of long hairs at the top. The inflorescence is open at the base and more congested at the tip. The spikelets have 7-13 florets. The glumes are about 1 mm long, the second longer than the first.

Purple lovegrass has been collected in Missoula. Introduced from Eurasia to most of the U.S.

Festuca L. Fescue

The members of this genus are annual or perennial, rhizomatous or bunch-forming grasses with hollow culms. The leaves have flat, folded, or rolled blades and sheaths with free margins. The 2- to 12-flowered spikelets are borne on erect to drooping branches of the open to contracted inflorescence. The narrow glumes have pointed tips and are usually unequal in length and shorter than the lemmas. The lemmas are rounded on the back and awnless or with a short awn-tip.

Some of the native species are among the most important forage grasses in our area.

1. Leaf blades flat, at least some >3 mm wide.....2
1. Leaf blades rolled or <3 mm wide.....4



m. *Elymus canadensis* n. *E. triticoides* o. *Eragrostis cilianensis* p. *E. pectinacea*

GRAMINEAE

2. Awns of the lemmas >4 mm long.....(10) F. subulata
2. Awns of the lemmas <2 mm long.....3
3. Flaplike appendages at the top of the leaf sheaths (auricles) with long hairs, leaf blades 4-10 mm wide.....(7) F. arundinacea
3. Auricles without long hairs, leaf blades mostly 3-5 mm wide.....(6) F. pratensis
4. Plants annual, old leaf bases and well-developed root system lacking.....(4) F. octoflora
4. Plants perennial with a well-developed root system.....5
5. Lower lemmas usually >7 mm long, awn-tipped or without awns.....6
5. Lower lemmas mostly <7 mm long with awns >1 mm long.....7
6. Leaf blades mostly <2.5 mm wide; culms usually <60 cm (24 in) tall.....(9) F. viridula
6. Leaf blades mostly >2.5 mm wide; culms usually >60 cm tall.....(3) F. scabrella
7. Branches of the inflorescence spreading or drooping.....(2) F. occidentalis
7. Branches of the inflorescence ascending to nearly erect.....8
8. Culms curved at the base or arising singly from a rhizome.....(5) F. rubra
8. Culms erect at the base without rhizomes.....9
9. Culms usually >30 cm (12 in) tall; inflorescence 10-20 cm (4-8 in) long; anthers 2-4 mm long.....(1) F. idahoensis
9. Culms usually <30 cm tall, inflorescence mostly <10 cm long; anthers < 2 mm long.....(8) F. ovina

Group I. These are native perennials most common in low-elevation grasslands and shrublands.

1. Festuca idahoensis Elmer

Idaho Fescue

Idaho fescue is a bunch-forming grass with numerous culms 30-100 cm (12-40 in) tall and bluish-green foliage that is glabrous or roughened. The mainly basal leaves have filiform, rolled blades. The 5- to 7-flowered spikelets are borne on spreading to ascending branches in the open inflorescence. The glumes are lance-shaped and 3-7 mm long, the second 1-2 mm longer than the first. The glabrous lemmas are about 5-7 mm long with an awn 2-5 mm long.

An important forage grass, it is common in grasslands and open forests in the foothills and montane zone especially on the east side of the Bitterroot Valley. It is less common in grasslands and balds in the subalpine zones. B.C. to CA, east to Alta., WY, and CO.

2. Festuca occidentalis Hook.

Western Fescue

This grass forms large tufts with mostly glabrous foliage and culms up to 100 cm (40 in) tall. Leaf blades are rolled and filiform. The mostly 4- to 5-flowered spikelets are borne on spreading or drooping branches in the open inflorescence. The glumes are 2-5 mm long, the second about 1 mm longer than the first. The lemmas are 4-6 mm long with a slender, often wavy awn 4-12 mm long.

Western fescue is locally common in open montane and lower subalpine forests and forest openings, especially in the Bitterroot Range. B.C. to CA, east to Ont., MI, and WY.

This plant is similar to F. idahoensis but has light green rather than bluish green foliage. F. occidentalis is often common along roads and at sites of timber harvests.

3. Festuca scabrella Torr.

Rough Fescue

Rough fescue forms large, dense bunches up to 30 cm (12 in) in diameter. Stout culms, 40-100 cm (16-40 in) tall, are purplish-pink at the bases. The mostly erect leaves have rolled or flat blades 2-4 mm wide that are rough to the touch. The 3- to 5-flowered spikelets are borne on stiffly ascending branches in the open inflorescence. The glumes are about 5-7 mm long, the second 1 mm longer than the first. The lemmas are rough to the touch and have a small awn-tip.

Locally common in more mesic grasslands in the foothills. In the extreme southern part of our area and in some parts of the Sapphire Range, rough fescue occurs on grassy balds at about 2135 m (7,000 ft) without any apparent loss of size or vigor. B.C. to Newf., south to CO and ND.

Rough fescue is one of our most palatable native bunch grasses, important to many big game species. It has decreased rapidly with overgrazing by livestock and is certainly much less common than it was in the past.

Group II. This group contains a single annual species found in grasslands in the valley zone.

4. Festuca octoflora Walt.
[Vulpia octoflora Rydb.]

Six Weeks Fescue

Usually a small plant with 1-few culms 5-20 cm (2-8 in) tall and glabrous or finely hairy foliage. The leaf blades are rolled and very narrow. The 8- to 12-flowered spikelets are borne on nearly erect branches in a narrow inflorescence. The slender glumes are 2-6 mm long, the second about 1 mm longer than the first. The lemmas have an awn-tip or an awn up to 7 mm long.

Var. octoflora usually has less than 8 florets per spikelet and awns mostly 2-5 mm long. It is locally common throughout our area. Var. tenella (Willd.) Fern. usually has more than 8 florets per spikelet and shorter awns. It is infrequent in the northern part of our area. B.C. to Baja Cal., east to Que., Mex. and FL.

Group III. These are introduced pasture grasses found mainly in moist soil associated with hay meadows.

5. Festuca rubra L.

Red Fescue

Red fescue forms small tufts with or without rhizomes and has culms 40-100 cm (16-40 in) tall that are usually curved at the base. The leaves have mostly rolled blades 1-2 mm wide and reddish, papery sheaths below. The green to purplish, 4- to 6-flowered spikelets are borne on nearly erect branches of the contracted inflorescence. The lance-shaped glumes are 2-8 mm long, the second about 2 mm longer than the first. The glabrous to densely hairy lemmas are 5-9 mm long with an awn 1-3 mm long.

Common in hay meadows in the lower Bitterroot Valley and can be found up to the montane zone. Native to Europe and much of temperate North America.

Known populations in our area are believed to have derived from commercial seed. It is not known whether this species is native here.

6. Festuca pratensis Huds.
[F. elatior L.]

Meadow Fescue

Usually forming small tufts from short rhizomes, this fescue has mostly glabrous foliage and culms 50-100 cm (20-40 in) tall. The leaf blades are flat or loosely rolled and 3-5 mm wide. The 5- to 7-flowered spikelets are borne on short, nearly erect to ascending branches in the narrow inflorescence. The lance-shaped glumes are 3-4 mm long, the second about 1 mm longer than the first. The glabrous lemmas are 5-7 mm long with an awn-tip.

Meadow fescue is locally common in hay meadows in the northern part of our area. Native to Europe and widely introduced in North America.

7. Festuca arundinacea Schreb.

Tall Fescue

Tall fescue is a strongly tufted plant with short rhizomes, mostly glabrous foliage, and culms often more than 100 cm (40 in) tall. The leaves have mostly flat blades 4-10 mm wide and long-hairy auricles at the top of the sheaths. The long spikelets are borne on ascending branches of the narrow, sometimes nodding inflorescence. The lance-shaped glumes are 4-7 mm long, the second about 2 mm longer than the first. The glabrous lemmas are 7-9 mm long and awnless.

This introduced pasture grass is infrequent in hay meadows and along ditches in the valleys at the north end of our area. Native to Europe and introduced in much of North America.

Group IV. These three tufted, perennial species occur only in the mountains, often at high elevations.

8. Festuca ovina L.
[F. brevifolia R.Br., F. brachyphylla Schult]

Sheep Fescue, Alpine Fescue

Sheep fescue forms small dense tufts of old leaf bases with culms up to 35 cm (14 in) tall and nearly glabrous foliage. The mostly basal leaves have folded blades less than 1 mm wide. The 3- to 4-flowered, green or purplish spikelets are borne on short, ascending branches in a narrow inflorescence. The lance-shaped glumes are 2-5 mm long, the second less than 1 mm longer than the first. The nearly glabrous lemmas are 3-5 mm long with an awn 1-3 mm long.

Var. brevifolia (R.Br.) Wats. has culms less than 20 cm (8 in) tall and is common in open, dry or occasionally moist habitats near or above timberline in the Bitterroot Mountains. Var. rydbergii St.-Yves has culms greater than 20 cm tall. It is uncommon in dry, open soil from the valleys to the lower subalpine zones. AK to Newf., south to CA, NM, and NY; Europe, South America.



q. *Festuca idahoensis* r. *F. occidentalis* s. *F. scabrella* t. *F. octoflora*



u. *Festuca rubra* v. *F. pratensis* w. *F. arundinacea* x. *F. ovina*

GRAMINEAE

9. Festuca viridula Vasey

Green Fescue

Green fescue forms small clumps with culms that are 30-60 cm (12-24 in) tall. The leaves have mostly flat blades 1-3 mm wide and glabrous to finely hairy sheaths. The loosely 3- to 6-flowered spikelets are borne toward the ends of relatively long, spreading or ascending branches of the inflorescence. The glumes are 2-7 mm long, the second about 1 mm longer than the first. The lemmas are 6-9 mm long, unawned or with an awn-tip up to 1 mm long.

Infrequent in bare mineral soil of open habitats at 2070-2590 m (6,800-8,500 ft) along the Selway Divide in the southern Bitterroot Mountains. B.C. to CA, east to Alta., MT, and ID.

10. Festuca subulata Trin.

Bearded Fescue, Nodding Fescue

Bearded fescue forms dense tufts of persistent, old foliage with erect culms 40-80 cm (16-32 in) tall. The drooping leaf blades are flat or loosely rolled and 4-10 mm wide. The 3- to 5-flowered spikelets are borne at the ends of spreading or drooping branches in an open inflorescence. The narrow glumes are 3-6 mm long, the second about 2 mm longer than the first. The lemmas are about 7 mm long with a slender awn 7-17 mm long at the tip.

Uncommon in moist montane or subalpine meadows, mostly in the Sapphire Range. AK to CA, east to MT, WY, and UT.

Glyceria R. Br. Mannagrass

The members of this genus are perennials that spread by rhizomes or prostrate stems that root at the nodes (stolons). The leaves have flat or folded blades and sheaths with joined margins. The elliptical or cylindrical spikelets are borne on erect to drooping branches of the open to contracted inflorescence. The glumes are usually unequal in length and shorter than the lemmas. The lemmas are papery at the tip, awnless, and rounded on the back with 5-9 prominent nerves.

These are plants of wet habitats.

- | | | |
|----|--|------------------------|
| 1. | Branches of the inflorescence mostly strictly erect, inflorescence narrow..... | (1) <u>G. borealis</u> |
| 1. | Branches of the inflorescence ascending or spreading, inflorescence more open..... | 2 |
| 2. | Smallest glume >1 mm long..... | (2) <u>G. grandis</u> |
| 2. | Smallest glume not more than 1 mm long..... | 3 |
| 3. | Leaf blades mostly 2-5 mm wide..... | (4) <u>G. striata</u> |
| 3. | Leaf blades mostly >5 mm wide..... | (3) <u>G. elata</u> |

1. Glyceria borealis (Nash) Batch.

Northern Mannagrass

Northern mannagrass has culms 60-100 cm (24-40 in) tall that are curved at the base and often root at the lower nodes. The foliage is glabrous. The leaf blades are flat or folded and about 3-5 mm wide. The cylindrical, 6- to 11-flowered spikelets, about 15 mm long, are borne on the ends of erect branches of the long, narrow inflorescence. The glumes are about 2-3 mm long. The lemmas are 7-nerved with a papery upper margin.

Common in standing water around streams, marshes, ponds, and irrigation ditches in the valley and montane zones. AK to CA, east to Newf., PA, and NM.

2. Glyceria grandis Wats.

American Mannagrass

This robust species has culms up to 200 cm (80 in) tall and glabrous or finely roughened foliage. The leaves have flat blades 6-15 mm wide and sheaths with free margins just at the top. The numerous 5- to 6-flowered spikelets are oblong and borne on spreading or drooping branches of the open inflorescence. The lance-shaped glumes are about 2-3 mm long. The purplish lemmas are 7-nerved and about as long as the glumes.

American mannagrass is infrequent, usually in standing water, in the valley and montane zones in the northern part of our area. AK to OR and NV, east to e. Can., e. U.S., IL, and AZ.

3. Glyceria elata (Nash) Jones

Tall Mannagrass

This rhizomatous species has tufted culms, 100-150 cm (40-60 in) tall, with foliage that is rough to the touch. The dark green leaf blades are flat and 6-10 mm wide. The 4- to 7-flowered spikelets are egg-shaped and borne on spreading or reflexed branches of the open inflorescence. The broadly lance-shaped glumes are about 1-2 mm long with short hairs along the margins. The 7-nerved lemmas are about 2 mm long with jagged margins.

Tall mannagrass is uncommon in wet soil along ponds and streams in the valley and montane zones in the northern part of our area. B.C. to CA, east to MT and NM.



y. *Festuca viridula* z. *F. subulata* a. *Glyceria borealis* b. *G. grandis*

GRAMINEAE

4. Glyceria striata (Lam.) A. S. Hitchc.

Fowl Mannagrass

Fowl mannagrass is rhizomatous and forms large bunches with culms 30-100 cm (12-40 in) tall. The foliage is slightly rough to the touch. The leaf blades are flat or folded and 2-5 mm wide. The purplish-tinged, 4- to 7-flowered spikelets are egg-shaped in outline and borne on ascending or spreading branches of the open inflorescence. The glumes are about 1 mm long and rounded or flattened on top with minute hairs along the margins. The 7-nerved lemmas are about 2 mm long.

Locally common in wet meadows and along streams in the valleys to the lower subalpine zone. It is abundant in meadows east of the Bitterroot River. AK to Newf., south to CA, n. Mex., and FL.

Hierochloa R. Br. Sweetgrass

Hierochloa odorata (L.) Beauv.

Sweetgrass, Vanilla Grass

Sweetgrass is a perennial with purplish-based culms, 25-60 cm (10-24 in) tall, arising singly from extensive rhizomes. The leaf blades of the culms are short, flat or folded, and 3-5 mm wide. The 3-flowered, yellowish-brown spikelets are borne on spreading or ascending branches in an open, pyramidal inflorescence. The wide glumes are glabrous and nearly equal in length. The lemmas are pubescent, unawned, and smaller than the glumes.

Infrequent in moist or wet meadows from the valleys to the lower subalpine zone. It occurs near Lolo Hot Springs and along the Bitterroot River south of Lolo where it blooms in the latter half of May. Circumboreal, south in North America to OR, NM, SD, and PA.

Sweetgrass is used by Native Americans as incense in religious ceremonies. The crushed foliage is sweetly fragrant.

Holcus L. Velvet Grass

Holcus lanatus L.

Common Velvet Grass

Common velvet grass is a perennial that forms tufts with culms, 20-80 cm (8-32 in) tall, that can be curved at the base or even prostrate and rooting at the nodes. Leaves have flat blades 3-10 mm wide and sheaths with free margins. The foliage is grayish short-hairy. The purplish, 2-flowered spikelets are crowded on short, ascending branches of the narrow inflorescence. The upper floret has only stamens. The hairy glumes are 3-4 mm long and nearly equal in length. The glabrous lemmas are shorter than the glumes, and the upper one bears a short curved awn.

Uncommon in our area, but most common on privately owned forest lands on the west side of the Bitterroot Valley. Native to Eurasia and widely introduced in North America.

This species is without forage value.

Hordeum L. Barley, Foxtail

Our wild barleys are tufted annuals or perennials with flat leaf blades and sheaths with free margins. The mostly 1-flowered, sessile or short-stalked spikelets are borne, usually 3 per node, in a dense, terminal spike. At each node, the central spikelet has both stamens and a pistil, while the lateral spikelets only have staminate or sterile florets. The glumes are narrow and awnlike. The lemmas are rounded on the back, usually with a long awn.

1. Plants annual; appendages at top of the leaf sheaths (auricles) >1 mm long.....(3) H. vulgare
1. Plants perennial; auricles lacking or much <1 mm long.....2
2. Glumes awnlike and >2 cm long; spike (awns included) nearly as wide as long.....(1) H. jubatum
2. Glumes <2 cm long; spike narrower.....(2) H. brachyantherum

1. Hordeum jubatum L.

Foxtail Barley

Foxtail barley is a perennial with densely tufted culms, 20-50 cm (8-20 in) tall, that are erect or curved at the base. The leaf blades are 2-4 mm wide, and the foliage is glabrous to soft-hairy. The purplish-tinged, nodding spike is 5-10 cm long and nearly as wide at maturity. The glumes are awnlike and 2-6 cm long. The spreading awns of the lemmas are nearly as long as the glumes.

Locally common along roadsides, railroad embankments, and other dry or vernal moist habitats in the valley and montane zones. Widespread in temperate North America.

See note under Sitanion hystrix.



c. *Glyceria elata* d. *G. striata* e. *Hierochloa odorata* f. *Holcus lanatus*

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2. Hordeum brachyantherum Nevski

Meadow Barley

This perennial grass forms small tufts of culms, 20-60 cm (8-24 in) tall, and glabrous or hairy foliage. The leaf blades are 2-6 mm wide. The mostly erect spikes are 5-10 cm long. The glumes are awnlike and 7-12 mm long. The lemma of the central spikelet has an awn longer than the glumes. The lateral lemmas are reduced and often sterile. The glumes and awns are ascending rather than spreading at maturity.

Meadow barley is infrequent and local in moist meadows in the valleys to the lower subalpine zone in the Sapphire Range. Widespread in w. North America and occasionally further east; Asia.

3. Hordeum vulgare L.

Barley

The barley of agriculture is an annual, mostly 30-50 cm (12-20 in) tall, with mostly glabrous foliage. The leaf blades are 10-15 mm wide. The spike is erect or slightly nodding at maturity. The narrow glumes are usually awned, and the lemmas usually have awns 10-15 cm long. All the spikelets are fertile and erect or ascending in the spike.

Found sometimes along the margins of cultivated fields and on roadsides and railroad embankments. Widely cultivated and escaped in North America.

Koeleria Pers. Junegrass

Koeleria cristata Pers.

Junegrass

[K. macrantha (Ledeb.) Schultes]

Junegrass is a perennial that forms small bunches with glabrous or hairy foliage and culms 20-50 cm (8-20 in) tall. The leaves have short, folded, or rolled blades 1-2 mm broad with prow-shaped tips. The sheaths have free margins that overlap at the top. The mostly 2-flowered spikelets are distinctly crowded on short, nearly erect branches of the glistening, narrow, spikelike inflorescence. The branches become spreading when the plants are in bloom. The awnless glumes are 3-6 mm long, the second about 1 mm longer than the first and about as long as the lemmas. The shiny, awnless or awn-tipped lemmas are 3-5 mm long.

This widespread grass is common on gravelly or rocky, shallow soils to deep loams from grasslands and sagebrush-grasslands in the valleys and foothills to open subalpine ridges. B.C. to n. Mex., east to Ont., ME, LA, and TX; temperate Eurasia.

Under excessive grazing this species will often increase at the expense of larger bunch grasses.

Leersia Soland. Cutgrass

Leersia oryzoides (L.) Swartz

Rice Cutgrass

Rice cutgrass is a rhizomatous perennial with culms 60-150 cm (24-60 in) tall and foliage that is rough to the touch. The leaves have sheaths with free margins and flat blades mostly 6-10 mm wide. The 1-flowered spikelets are borne on spreading or ascending branches of the open inflorescence. Smaller inflorescences bearing self-pollinating spikelets often occur in the upper leaf sheaths. The spikelets lack glumes. The awnless lemmas are about 5 mm long and sparsely covered with short, stiff hairs. The palea is about the same size as the lemma.

Found in a wet meadow at Lolo Hot Springs. Southern Can. and most of the U.S.; Europe.

Lolium L. Ryegrass

Our members of this genus are introduced annuals or short-lived perennials with leaf sheaths that have free margins. The numerous many-flowered spikelets are flattened, sessile, and turned edgewise on opposite sides of the axis of the narrow terminal spike. All but the terminal spikelet have only one unawned glume. The lemmas are awned or unawned.

Many species are cultivated for hay or as lawn grasses. Both of our species are often sold in lawn seed mixtures, and they sometimes escape and establish along roads.

1. Lemmas with awns 2-8 mm long.....(1) L. multiflorum
1. Lemmas awnless.....(2) L. perenne

1. Lolium multiflorum Lam.

Italian Ryegrass

This grass is a biennial or short-lived perennial with culms 30-70 cm (12-28 in) tall and glabrous foliage. The flat or slightly rolled leaf blades are 4-8 mm wide. The spike is 10-25 cm long, and the spikelets are 5- to 15-flowered. The pointed glumes are 7-12 mm long, slightly longer than the lowest lemma. The lemmas have an awn 2-8 mm long.



g. *Hordeum jubatum* h. *H. brachyantherum* i. *H. vulgare* j. *Koeleria cristata* k. *Leersia oryzoides*

GRAMINEAE

Italian ryegrass is infrequent in the northern part of our area. Native to Europe and established throughout much of temperate North America.

2. Lolium perenne L.

Perennial Ryegrass

Perennial ryegrass is a short-lived perennial that forms small tufts with culms up to 80 cm (32 in) tall and glabrous foliage. Leaf blades are 3-4 mm wide. The 6- to 10-flowered spikelets are crowded in a spike 10-25 cm long. The narrowly lance-shaped glumes are 7-10 mm long, longer than the lowest lemma. The lemmas are unawned.

This grass is infrequent in the northern part of our area. Native to Europe and widespread in North America.

Melica L. Melic, Oniongrass

The melics are bunch-forming or rhizomatous perennials with stems that are enlarged and bulbous at the base (ours) and leaf sheaths with united margins. The 2- to several-flowered spikelets are borne on the ends of erect to spreading branches in the open to contracted inflorescence. The uppermost 2-4 florets are composed of sterile lemmas enfolded in each other. The broadly elliptical, papery glumes are shorter than the lowest lemma. The lemmas are firmer than the glumes, rounded on the back, and awned from the tip.

1. Lemmas tapered to a sharp awn-tip and long hairs on the lower half.....(3) M. subulata
1. Lemmas with a broadly pointed or rounded tip without long hairs.....2
2. Culms arising singly ca. 1-3 cm apart on the rhizome, lemmas 6-8 mm long.....(2) M. spectabilis
2. Culms clustered, lemmas 9-12 mm long.....(1) M. bulbosa

1. Melica bulbosa Geyer

Oniongrass

Oniongrass has loosely tufted culms, 30-70 cm (12-28 in) tall, with bulbous bases tightly clustered on short rhizomes. The leaves have sheaths that are closed almost their full length and flat to somewhat rolled blades 2-4 mm wide. The mostly 3- to 5-flowered spikelets are borne on erect or ascending branches of the narrow, elongated inflorescence. The narrow glumes are 7-13 mm long, the second about 2 mm longer than the first. The lemmas are 9-12 mm long and lightly 7- to 9-nerved.

Locally common in moist montane and subalpine meadows. It also occurs on grassy, east-facing slopes of the Selway-Bitterroot Divide at 2345-2590 m (7,700-8,500 ft). B.C. to CA, east to MT, WY, and CO.

2. Melica spectabilis Scribn.

Showy Oniongrass

This melic has bulbous-based culms, 30-80 cm (12-32 in) tall, arising singly at intervals of a few cm from a long rhizome. The leaves have sheaths that are open on the top 3-10 mm and flat or loosely rolled blades 2-4 mm wide. The foliage is glabrous or short hairy. The purplish 3- to 8-flowered spikelets are borne on short, ascending branches of the narrow inflorescence. The glumes are 5-7 mm long, the second about 1 mm longer than the first. The blunt-tipped lemmas are strongly nerved and about 7 mm long.

Showy oniongrass is infrequent in moist montane and subalpine meadows. B.C. to CA, east to Alta., MT, and CO.

This and the former species sometimes occur together, and with their relatively large and brown or purplish-tinged spikelets, they are distinctive among the other grasses.

3. Melica subulata (Griseb.) Scribner

Alaskan Oniongrass

Alaskan oniongrass has bulbous-based culms, 30-80 cm (12-32 in) tall, that are tightly clustered on thick rhizomes. The leaves have sheaths that are closed to the top and flat blades 2-7 mm wide. The loosely 2- to 5-flowered spikelets are borne on ascending or rarely spreading branches in narrow, open inflorescences. The pointed glumes are 5-9 mm long, the second 1-2 mm longer than the first. The weakly nerved, unawned lemmas are 9-13 mm long and covered with long hairs on the lower half.

Uncommon in moist meadows in the montane and lower subalpine zones. AK to CA, east to MT, ID, and WY.

Muhlenbergia Schreb. Muhly

Members of this genus are annuals and tufted or rhizomatous perennials with leaves that have narrow blades and sheaths with free margins. The 1-flowered spikelets are borne on erect or spreading branches in a narrow or open inflorescence. The glumes and lemmas are obtuse, pointed or awned. The glumes are much shorter to slightly longer than the 3-nerved lemmas.



l. *Lolium multiflorum* m. *L. perenne* n. *Melica spectabilis* o. *M. bulbosa*

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1. Plants forming bunches in dry grasslands.....(2) M. cuspidata
1. Plants arising singly or forming mats in moist to wet habitats.....2
2. Inflorescence narrow with nearly erect branches.....(1) M. filiformis
2. Inflorescence open with widely spreading branches.....(3) M. asperifolia

1. Muhlenbergia filiformis (Thurb.) Rydb.

Slender Muhly

This small plant is an annual or sometimes a perennial with culms, 3-10 cm (1-4 in) tall, that branch at the base and often root at the nodes of prostrate stems. The leaves have flat blades 1-3 mm wide and glabrous sheaths. The often interrupted, spikelike inflorescence is 15-50 mm long. Glumes are 0.5-1 mm long, the second slightly longer than the first. The mostly short-hairy lemmas are about 2 mm long with a short awn-tip.

Slender muhly occurs in permanent seepage areas and moist depressions of montane to upper subalpine meadows. B.C. to CA, east to Alta., SD, and NM.

2. Muhlenbergia cuspidata (Torr.) Rydb.

Plains Muhly

Plains muhly forms small bunches with slightly flattened culms 20-40 cm (8-16 in) tall. The leaves have flat blades 1-2 mm wide and short-hairy sheaths. The spikelike inflorescence is 5-12 cm (2-5 in) long. The glumes have a short awn-tip and are about 2 mm long and nearly equal in length. The lemmas are about 3 mm long with a short awn-tip.

This Great Plains species was collected once in dry grasslands in the foothills of the southern Sapphire Range. Alta. to Sask., south to NM, OK, MO, and KY.

3. Muhlenbergia asperifolia (Nees & Meyen) Parodi

Scratchgrass

Scratchgrass has strong, scaly rhizomes and erect or ascending stems up to 30 cm (12 in) tall that branch at the base. The crowded leaves have flat blades 1-2 mm wide and glabrous sheaths. The spikelets are borne on the ends of widely spreading, hairlike branches of the open inflorescence. The inflorescence is 5-15 cm (2-6 in) high, nearly as wide, and breaks off the stem at maturity. The glumes are about 1 mm long, and the lemmas are slightly longer; both are unawned.

Collected in a wet, sandy area along Willoughby Creek northeast of Victor. B.C. to CA, east to Mex., TX, and MN; South America. (Not illustrated).

Munroa Torr. Munroa

Munroa squarrosa (Nutt.) Torr.

False Buffalograss

This mat-forming annual has stems up to 10 cm (4 in) tall that are branched at the base and above. The leaves are tufted at the nodes and about 2 mm wide. The 3- to 5-flowered spikelets are subtended by 2 or 3 reduced leaves at the upper nodes of the stems. The glumes are nearly equal in length and shorter than the lemmas that are 5-8 mm long. The lemmas are long-hairy on the margins with short awn-tips.

False buffalograss, a Great Plains species, was collected many years ago in Missoula south of Patee Canyon. Alta. to ND, south to CA, NM, and TX.

Oryzopsis Michx. Ricegrass

Ricegrasses are perennial bunch-formers with leaf blades that are flat to strongly rolled and sheaths with free margins. The 1-flowered spikelets are borne at the ends of nearly erect to spreading branches of the open to congested inflorescences. The glumes are nearly equal in length. Lemmas are hardened with a bent and twisted awn from the tip and a sharp-pointed base.

1. Inflorescence narrow; awns bent and lemmas short-hairy.....(1) O. exigua
1. Inflorescence open and spreading; awns straight and lemmas long-hairy.....(2) O. hymenoides

1. Oryzopsis exigua Thurb.

Little Ricegrass

Little ricegrass forms clumps of old leaf sheaths and has culms 10-30 cm (4-12 in) tall. The leaf blades are erect, tightly rolled, and less than 1 mm wide. Spikelets are borne on short, erect branches in the narrow inflorescence. The glumes are 4-6 mm long, about equal to the lemmas. The lemmas are hairy with a bent awn 4-6 mm long.

Locally common in shallow and sandy, dry soils of exposed habitats from the montane zone to above timberline. B.C. to OR, east to MT, UT, and CO.

2. Oryzopsis hymenoides (R. & S.) Ricker

Indian Ricegrass

This ricegrass forms large tufts with the remains of old leaves at the base. The culms are 20-50 cm (8-20 in) tall, and the rolled leaf blades are about 1 mm wide. Spikelets are borne on the ends of long, greatly divided, spreading or reflexed branches in the open inflorescence. The whitish glumes are 4-6 mm long, longer than the lemma. The dark, long-hairy lemmas are spindle-shaped with an awn 4-6 mm long.

Indian ricegrass is rare in our area but has been repeatedly observed on dry exposed ridges in the foothills just north of Missoula and east of Victor. B.C. to CA, east to Alta., SD, TX, and n. Mex.

Panicum L. Panic Grass, Witchgrass

These are annual or perennial grasses with leaves that have mostly flat blades and sheaths with free margins. The 2-flowered spikelets are borne at the ends of long, nearly erect to spreading branches of an open to congested inflorescence. The first glume is usually shorter than the second. The lower lemma is sterile, while the fertile lemma is hardened and awnless.

- | | | | | |
|----|--|-----|---------------------------|---|
| 1. | Plants perennial; glumes and lemmas hairy..... | (4) | <u>P. occidentale</u> | 2 |
| 1. | Plants annual; glumes and lemmas glabrous..... | | | 2 |
| 2. | Leaf sheaths glabrous except for sparse long hairs at the top..... | (3) | <u>P. dichotomiflorum</u> | 3 |
| 2. | Leaf sheaths densely long hairy..... | | | 3 |
| 3. | Spikelets 4-5 mm long..... | (2) | <u>P. miliaceum</u> | |
| 3. | Spikelets <3.5 mm long..... | (1) | <u>P. capillare</u> | |

1. Panicum capillare L.

Common Witchgrass

Common witchgrass is an annual with culms, 20-70 cm (8-28 in) tall, that branch from the base. The leaf blades are 5-12 mm wide, and the foliage is long-hairy. Spikelets are borne on the ends of numerous spreading branches in an open inflorescence. The second glume and the sterile lemma are both glabrous and about 2-3 mm long.

A native weed that is common in moist, fertile soils of fields and gardens in the valleys. Widespread in s. Can. and the U.S.

2. Panicum miliaceum L.

Broomcorn Millet

This panic grass is an annual with erect culms up to 100 cm (40 in) tall and finely hairy foliage. The leaf blades are 7-15 mm wide and wavy-margined. Spikelets are borne on the ends of nearly erect branches of the narrow, congested inflorescence. The spikelets are 4-5 mm long and mostly glabrous. The glumes and lemmas are strongly 7- to 11-nerved.

An Old World species, it is persistently reintroduced with commercial bird seed and found occasionally near homes and gardens. Widespread in the U.S.

3. Panicum dichotomiflorum Michx.

Fall Panic Grass

Fall panic grass is an annual with culms up to 100 cm (40 in) tall that are curved and branched at the base. The leaf blades are 4-12 mm wide, and the foliage is mostly glabrous. The numerous spikelets, 2-3 mm long, are borne on the ends of spreading or ascending branches of the open inflorescence. The glumes and lemmas are glabrous.

Collected in waste ground near the railroad station on the north side of Missoula. Native to e. U.S. and introduced in the western states.

4. Panicum occidentale Scribner
[P. lanuginosum Ell.]

Western Witchgrass

This grass is a simple or branched and prostrate perennial with culms up to 30 cm (12 in) tall and long-hairy foliage. The upper leaf blades, 5-12 mm wide, are larger than the basal ones. The spikelets, about 2 mm long, are borne on ascending branches in the open inflorescence. The glumes and lemmas are hairy.

Generally a plant of river banks, lake margins, and hot springs, western witchgrass was recently collected in wet soil at Lolo Hot Springs. B.C. to CA, east to Alta., WY, and AZ.

Phalaris L. Canary Grass

The canary grasses are annuals or rhizomatous perennials (ours) with leaves that have flat blades and sheaths open along the margins. The mostly 3-flowered spikelets are borne in congested, spike-like



p. *Melica subulata* q. *Muhlenbergia filiformis* r. *M. cuspidata* s. *Munroa squarrosa* t. *Oryzopsis exigua*
 u. *Oryzopsis hymenoides*

inflorescences. The lower 2 florets of each spikelet are sterile and reduced in size. The fertile lemma is much shorter than the glumes.

1. Leaves 3-8 mm wide; inflorescence continuous and spikelike.....(2) P. aquatica
1. Leaves 7-17 mm wide; inflorescence interrupted with obvious side branches.....(1) P. arundinacea

1. Phalaris arundinacea L.

Reed Canary Grass

A tall, rhizomatous perennial, reed canary grass has culms up to 150 cm (60 in) tall. Leaf blades are 7-17 mm wide. The mostly strongly compressed, 3-flowered spikelets are congested on spikelike, nearly erect, side branches of the narrow, elongated inflorescence. The glumes are 4-5 mm long and about equal in length. The fertile lemma is mostly glabrous and 3-4 mm long.

Locally common in marshes and sloughs and in roadside ditches in the valleys and foothills. Circumboreal, south to most of the U.S.

Although experts feel that this species is native in parts of Canada, it is not known whether it is native in our area. In some situations it can be very aggressive, forming pure stands in many wetlands in Montana and elsewhere.

2. Phalaris aquatica L.

Harding Grass

Harding grass is a rhizomatous perennial with culms up to 200 cm (80 in) tall and leaf blades 3-8 mm wide. The spikelets are congested on short, nearly erect branches of the spikelike inflorescence. The glumes are 6 mm long. The fertile lemma is about 4 mm long and hairy.

Once collected near Hamilton. Native to Eurasia, occasionally introduced in the U.S.

Phleum L. Timothy

In our area, members of this genus are tufted perennials with leaves that have flat blades and sheaths with free margins. The strongly flattened, 1-flowered spikelets are tightly congested on short, nearly erect side branches of the narrow, spikelike inflorescence. The glumes are nearly equal in length with long, thick hairs along the margins and a short thick awn at the tip. The papery lemmas are much shorter than the glumes.

1. Culms bulbous-based; inflorescence usually >45 mm long.....(1) P. pratense
1. Culms not bulbous-based; inflorescence usually <45 mm long.....(2) P. alpinum

1. Phleum pratense L.

Timothy

Timothy has culms, 40-100 cm (16-40 in) tall, with a thickened, bulbous base. The foliage is glabrous and the leaf blades are 4-8 mm wide. The inflorescence is usually long-cylindrical. The glumes are 3-4 mm long with long, thick hairs along the margins and an awn 1-2 mm long. The short-hairy lemmas are about 2 mm long.

This Eurasian meadow grass is common in fields and moist, disturbed ground from the valleys to the lower subalpine zone. Widespread in temperate North America.

2. Phleum alpinum L.

Alpine Timothy

Alpine timothy forms small bunches with culms, 10-40 cm (4-16 in) tall, that are curved but not bulbous at the base. The foliage is glabrous, and the leaf blades are 4-7 mm wide. The inflorescence is short-cylindrical or nearly elliptical. The glumes are about 4 mm long with long, thick hairs along the margins and a thick awn about 2 mm long. The lemmas are sparsely hairy and about 2 mm long.

Locally common in meadows from the montane zone to above timberline. AK to Newf., south to through most of W. U.S. and Mex.; Europe.

Intermediates between this species and P. pratense are not uncommon in the lower mountains.

Phragmites Trin. Reed

Phragmites communis (L.) Trin.

Common Reed

[P. australis (L.) Trin. ex Steud.]

The common reed is a rhizomatous perennial with culms 150-300 cm (40-120 in) tall. The leaves have flat blades 10-40 mm wide and sheaths with free margins. The blades fall from the plant by the end of summer. The 3- to 6-flowered spikelets are crowded on nearly erect or ascending branches of the feathery inflorescence that is purplish at first but turns tawny at maturity. The lance-shaped glumes are 4-9 mm long, the second half again as long as the first. The lemmas are 9-12 mm long, the lowest awn-tipped and



v. *Panicum capillare* w. *P. miliaceum* x. *P. dichotomiflorum* y. *P. occidentale* z. *Phalaris arundinacea*
a. *Phalaris aquatica*

the rest with awns up to 9 mm long. The lemmas are glabrous but are partly hidden by the long hairs on the axis that bears the florets.

Our tallest native grass has been reported for Milltown Reservoir east of Missoula. Cosmopolitan in temperate parts of the world.

Poa L. Bluegrass

These are native or introduced, annual or perennial, bunch-forming or rhizomatous grasses. The leaves have sheaths with free margins and flat, folded, or rolled blades, usually with tips shaped like the prow of a boat. The 2- to 7-flowered spikelets are borne on nearly erect to spreading or reflexed branches of the open or contracted inflorescence. The glumes are equal or unequal in length and usually much shorter than the lemmas. The lemmas are variously hairy, unawned, and often prominently 5-nerved.

This is the largest genus of grasses in our area. Many of them are similar and difficult to tell apart without examination under a microscope.

1. Culms bulbous at the base; most florets converted to small, purplish-based bulbs.....(4) P. bulbosa
1. Culms not bulbous-based; florets not converted to bulbs.....2
2. Plants annual, often forming mats but bases of old stems lacking.....(3) P. annua
2. Plants perennial, bases of old stems or extensive rhizomes usually apparent.....3
3. Plants rhizomatous, though culms sometimes arising in small tufts.....4
3. Plants lacking rhizomes although stems may be prostrate at the base and rooting at the nodes.....8
4. Lemmas with long, tangled hairs at the base.....5
4. Lemmas without long tangled hairs.....7
5. Culms strongly flattened, 2-edged.....(2) P. compressa
5. Culms more or less round in cross section, not 2-edged.....6
6. Plants near or above timberline.....(25) P. grayana
6. Plants of the valleys or lower mountains.....(1) P. pratensis
7. Lemmas with sparse, short hairs, or hair lacking.....(11) P. nervosa
7. Lemmas with more dense and longer hair on the nerves and margins.....(25) P. grayana
8. Spikelets only slightly flattened, >2 times as long as wide; lemmas rounded on the back or the midvein only obscurely raised like a keel.....9
8. Spikelets definitely compressed, <2 times as long as wide; lemmas prominently keeled on the back....15
9. Lemmas glabrous or very finely roughened; plants of moist habitats in the valleys.....10
9. Lemmas hairy on the lower half or at least at the base.....11
10. Ligules of culm leaves <1 mm long.....(10) P. juncifolia
10. Ligules of culm leaves >1 mm long.....(9) P. nevadensis
11. Sheath definitely rough to the touch.....(18) P. scabrella
11. Sheaths not rough to the touch.....12
12. Inflorescence open with spreading branches.....(14) P. gracillima
12. Inflorescence narrow with ascending or nearly erect branches.....13
13. Culms mostly >30 cm (12 in) tall.....(12) P. canbyi
13. Culms usually <30 cm tall.....14
14. Plants mostly of valleys and foothills, blooming before July; leaf blades <1 mm wide.....(7) P. sandbergii
14. Plants usually subalpine or above, blooming after July; leaf blades >1 mm wide.....(19) P. incurva
15. Lemmas with long, tangled hairs at the base.....16
15. Lemmas lacking long, tangled hairs at the base.....21
16. Lemmas without hairs on the margins.....(6) P. trivalis
16. Lemmas with hairs on the margins.....17
17. Spikelets borne on the ends of slender, spreading or reflexed branches of the inflorescence; lowest branches 2 per node.....18
17. Spikelets borne on spreading to nearly erect branches of the inflorescence; lowest branches >2 per node.....19

GRAMINEAE

- 18. Lowest branches of inflorescence distinctly reflexed.....(23) P. reflexa
- 18. Lowest branches of inflorescence spreading but not reflexed.....(24) P. leptocoma
- 19. Culms 30-120 cm (12-50 in) tall, plants of wet; low-elevation habitats.....(5) P. palustris
- 19. Culms <40 cm (16 in) tall, plants of drier; often higher elevation habitats.....20
- 20. Culms usually >20 cm (8 in) tall; longer glume usually 2-3 mm long.....(15) P. interior
- 20. Culms mostly <20 cm; longer glume 3-5 mm long.....(20) P. pattersonii
- 21. Lemmas glabrous or uniformly short-hairy.....22
- 21. Lemmas with longer hairs on the midvein and margins than between them.....23
- 22. Culms <10 cm (4 in) tall.....(22) P. lettermanii
- 22. Culms >10 cm tall.....(8) P. cusickii
- 23. Inflorescence open, often pyramidal in outline; branches arching, spreading or ascending.....24
- 23. Inflorescence narrow, branches nearly erect.....25
- 24. Inflorescence somewhat nodding and 1-sided; leaves <2.5 mm wide.....(16) P. stenantha
- 24. Inflorescence erect and symmetrical; leaves 2-4 mm wide.....(13) P. alpina
- 25. Culms >20 cm (8 in) tall; most plants lacking fertile anthers.....(17) P. fendleriana
- 25. Culms <20 cm tall; plants with functional anthers.....26
- 26. Longest glume 3-4.5 mm long, about the same height as the lowest lemma.....(20) P. pattersonii
- 26. Longest glume 2.5-3.5 mm long, shorter than the lowest lemma.....(21) P. rupicola

Group I. These are introduced, rhizomatous perennials restricted to or most common in the valleys and foothills.

1. Poa pratensis L.

Kentucky Bluegrass

Kentucky bluegrass has mostly erect culms 30-100 cm (12-40 in) tall and mostly glabrous foliage. The flat or occasionally folded leaf blades are 2-4 mm long. The 3- to 5-flowered spikelets are borne on the ends of spreading or ascending branches of the open, pyramidal inflorescence. Glumes are about 3 mm long with a distinct ridge along the back. The lemmas are also strongly ridged and 3-4 mm long with long, tangled hairs at the base.

Common in fields, meadows, grasslands, and many disturbed, open or shaded habitats. It is most common in the valleys and foothills but can be found even at high elevations such as on Ward Mtn. west of Hamilton. Native to Eurasia and established in most of temperate North America.

Kentucky bluegrass is widely used in seed mixtures for lawns and hay meadows. It is now found in most all moist meadows and riparian areas in the valley and montane zones.

2. Poa compressa L.

Canada Bluegrass

This bluegrass has erect, strongly flattened and 2-edged culms up to about 40 cm (16 in) tall. The flat or folded leaf blades are 2-4 mm wide with sharply pointed, prow-shaped tips. The dark green foliage is mostly glabrous. The mostly 3- to 6-flowered spikelets are borne along short, ascending branches in the compact inflorescence. The glumes are about 3 mm long. The lemmas are 2-4 mm long and strongly ridged on the back, the ridge and margins hairy but without tangled hairs.

Canada bluegrass is common in meadows and grasslands in the valley and montane zones. Native to Europe and introduced into most of temperate North America.

This species is similar to P. pratensis, but it will tolerate drier and poorer soils. It occurs on sandy soils at about 1830 m (6,000 ft) on Mormon Peak southwest of Lolo.

Group II. These 2 species are introduced annuals or tufted perennials common in disturbed areas in the valleys and foothills.

3. Poa annua L.

Annual Bluegrass

This grass is an annual with erect to spreading culms up to 20 cm (8 in) tall that root at the nodes and form small mats. The foliage is glabrous, and the folded leaf blades are 1-4 mm wide. The 3- to 6-flowered spikelets are borne on few short, spreading or ascending branches in the open, pyramidal inflorescence. The glumes are about 2 mm long, unequal in length. The papery lemmas are 3-4 mm long and hairy on the nerves.

Common as a weed in lawns and gardens but also along roads and trails as high as the lower subalpine zone. Native to Europe and introduced in temperate regions throughout the world.



b. *Phleum alpinum* c. *P. pratense* d. *Phragmites communis* e. *Poa pratensis* f. *P. compressa*

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4. Poa bulbosa L.

Bulbous Bluegrass, Viviparous Bluegrass

This bluegrass is a tufted perennial with bulbous-based culms up to 40 cm (16 in) tall and glabrous foliage. The flat or folded leaf blades are 1-3 mm wide. Most of the spikelets are modified into small, purplish bulbs enclosed by several leaflike, sterile lemmas 5-20 mm long. Normal spikelets have glumes 2-3 mm long and about 5 florets with lemmas 2-4 mm long and long, tangled hairs at the base. The spikelets are borne on spreading or ascending branches of the open or contracted inflorescence.

Locally common in disturbed ground of fields and grasslands in the valley. It is especially common in vacant lots in Missoula. Introduced from Europe and common in much of s. Can. and w. U.S.

Group III. These 2 introduced species are tall, tufted, perennial grasses of moist or wet soil mostly in the valley and montane zones.

5. Poa palustris L.

Fowl Bluegrass

Fowl bluegrass has densely tufted culms, 40-100 cm (16-40 in) tall, that are often prostrate at the base and rooting at the nodes. It often forms large tussocks. The flat or folded leaf blades are 1-3 mm wide. The mostly 2- to 4-flowered spikelets are borne on the ends of spreading branches that are grouped in distinct, widely separated whorls of the open inflorescence. The slender glumes are nearly equal and slightly shorter than the lowest lemma. The lemmas are 2-3 mm long with short hair on the nerves and long, tangled hairs at the base.

Common in fertile, wet soils in the valley to lower subalpine zones, particularly in the Sapphire Range. Introduced from Europe into most of Can. and the U.S.

6. Poa trivalis L.

Rough Bluegrass

This grass has culms, 40-100 cm (16-40 in) tall, that are prostrate at the base and rooting at the nodes. The flat, drooping blades are 2-4 mm wide. The 2- or 3-flowered spikelets are borne on ascending branches in an open, pyramidal inflorescence. The narrow glumes are 2-3 mm long, the second about 1 mm longer than the first. Lemmas are about 3 mm long with short hairs on the central nerve and long, tangled hairs at the base.

Collected in a moist meadow along the West Fork of the Bitterroot River southwest of Darby. Native of Europe and introduced in much of e. U.S. and Can. and sporadically in w. North America.

Group IV. These 2 species are low or medium-sized, native, tufted species of grasslands and shrublands; most common in the valley and montane zones.

7. Poa sandbergii Vasey [P. secunda Presl]

Sandberg's Bluegrass

Sandberg's bluegrass forms small bunches of basal leaves with culms up to 40 cm (16 in) tall. The short leaf blades are folded or rolled and about 1 mm wide. The 3- to 5-flowered, purplish or reddish spikelets are borne on nearly erect branches that become spreading during flowering. The glumes are 3-4 mm long, the second slightly longer than the first. Lemmas are about 4 mm long with short hairs on the lower half.

This species is one of our most common bunch grasses, occurring in grasslands and in dry, shallow soils of outcrops and ridge tops. It is most abundant in the valleys and foothills but can be found to above timberline. Yuk. to ND, south to CA, NM, and NE.

8. Poa cusickii Vasey

Cusick's Bluegrass, Skyline Bluegrass

This strongly tufted grass has mostly glabrous foliage and culms 12-40 cm (5-16 in) tall. The blades of the basal leaves are rolled and about 1 mm wide, while those of the stem are often flat and 1-4 mm wide. The green or purplish, 3- 5-flowered spikelets are borne on short ascending or nearly erect branches of the compact inflorescence. Most florets lack stamens. The glumes are nearly equal and 3-5 mm long. Lemmas are 4-6 mm long, sometimes glabrous but usually very short hairy.

Var. cusickii has rolled stem leaves less than 1 mm wide, and the culms are 12-25 cm (5-10 in) long. It is locally common in dry grasslands and meadows from the valleys to timberline. It is most common on the west slopes of the Sapphire Range and has been collected on St. Joseph Peak west of Florence. Var. epilis (Scribn.) C.L. Hitchc. has folded leaf blades greater than 1 mm wide, and culms mostly 20-40 cm (8-12 in) tall. It is common in moist subalpine meadows up to timberline. B.C. to CA, east to Sask. and CO.

Group V. These 2 tufted perennial grasses occur in moist or vernal wet, often alkaline or saline habitats in the valleys.



g. *Poa annua* h. *P. bulbosa* i. *P. palustris* j. *P. trivialis* k. *P. sandbergii* kk. *P. incurva* l. *P. cusickii*

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9. Poa nevadensis Vasey

Nevada Bluegrass

Nevada bluegrass forms dense tufts of basal leaves with culms 30-100 cm (12-40 in) tall. The leaf blades are flat, folded, or strongly rolled and about 3 mm wide. The mostly 4- to 6-flowered spikelets are borne on congested, nearly erect branches of the narrow inflorescence. The glumes are 3-5 mm long, the second about 1 mm longer than the first. The lemmas are 3-5 mm long and usually roughened over the entire surface but sometimes with some hair at the base.

This species was collected once on the east side of the Bitterroot Valley. Yuk. to CA, east to MT, CO, and AZ.

10. Poa juncifolia Scribn.

Alkali Bluegrass

Similar to the previous species, this tufted grass has culms up to 100 cm (40 in) tall. The leaf blades are flat to tightly rolled and up to 3 mm wide. The 3- to 7-flowered spikelets are borne on nearly erect branches of the narrow inflorescence. The glumes are nearly equal and 3-5 mm long. Lemmas are 4-6 mm long, roughened over the back, and short-hairy on the lower portion.

Alkali bluegrass was collected in a slightly alkaline meadow south of Florence. B.C. to CA, east to Alta., SD, CO, and NM.

Small differences in the ligule separate this species from P. nevadensis. These species are closely related and intermediate forms can occur.

VI. These grasses are most common in open to partially shaded habitats in the mountains.

11. Poa nervosa (Hook.) Vasey

Wheeler's Bluegrass

Obviously rhizomatous, this perennial grass has culms 25-70 cm (10-28 in) tall and leaf sheaths that are reddish or purplish toward the base. The flat or folded blades are 2-4 mm wide. The 4- to 7-flowered spikelets are borne on the ends of ascending to drooping branches in the open, pyramidal inflorescence. The florets are mostly without fertile stamens. The glumes are 3-4 mm long and nearly equal. Lemmas are 4-5 mm long, with a keeled midvein, and short-hairy on the nerves or over the entire back.

Wheeler's bluegrass is common in partial shade of forest openings in the montane to the subalpine zones. B.C. to CA, east to Alta., CO, and NM.

12. Poa canbyi (Scribn.) Howell

Canby's Bluegrass

Canby's bluegrass forms small, dense clumps with culms mostly 25-40 cm (10-16 in) tall that are purplish at the base. The leaves are short and clustered at the base. The purplish 3- to 5-flowered spikelets are borne on nearly erect to ascending branches that become spreading during flowering time. The glumes are nearly equal and 3-4 mm long. Lemmas are about 4 mm long and pubescent on the lower half.

Common in drier grasslands or meadows and rock outcrops from the montane to the subalpine zones. B.C. to CA, east to Sask. and CO.

This grass is closely related to P. scabrella, and some authors combine them under the latter name. P. scabrella has foliage that is very rough to the touch, while in P. canbyi the leaf sheaths are usually smooth. Both species are very similar to P. sandbergii. (Not illustrated).

Group VII. These are tufted perennials occurring in meadows and on mesic slopes in the mountains.

8. Poa cusickii Vasey

Cusick's Bluegrass, Skyline Bluegrass

Var. epilis (Scribn.) Hitchc. is common in meadows and on moist slopes in the subalpine zones. See description above.

13. Poa alpina L.

Alpine Bluegrass

Alpine bluegrass forms small tufts with culms 10-25 cm (4-10 in) tall and bluish-green, glabrous foliage. The short leaf blades are flat or folded, 2-4 mm wide, and mostly clustered at the base. The purplish, 3- to 6-flowered spikelets are borne on short, spreading branches in the open, pyramidal inflorescence. The broad glumes are 3-4 mm long and slightly unequal. The lemmas are 3-5 mm long and hairy on the lower half with longer hairs on the midvein.

Although very rare in the Bitterroot Mountains, it is locally common in subalpine meadows of the Sapphire Range. Circumboreal, south in w. North America to OR, UT, and CO.

14. Poa gracillima Vasey

Slender Bluegrass

This species forms small bunches with glabrous foliage and culms 15-35 cm (6-14 in) tall. The mostly basal leaves have flat, drooping blades about 1 mm wide. The 3- to 7-flowered spikelets are borne on the ends of spreading branches in the open, pyramidal inflorescence. The glumes are about 3-5 mm long, the

second slightly longer than the first. Lemmas have short hair on the nerves and at the base, and are glabrous in between.

Locally common in moist meadows from the lower subalpine zone to above timberline in the northern part of the Bitterroot Mountains. B.C. to CA, east to Alta., WY, and CO.

15. Poa interior Rydb.

Inland Bluegrass

Inland bluegrass is a tufted perennial with culms, 20-40 cm (8-16 in) tall, and drooping, flat or rolled blades 1-2 mm wide. The 2- or 3-flowered spikelets are borne on ascending branches of the open, pyramidal inflorescence. The glumes are nearly equal and about 2-3 mm long. The lemmas are 3-4 mm long, short-hairy on the lower margins and midvein, and usually with long, tangled hairs at the base.

Locally common in forests and forest openings, always in habitats that are at least vernal moist, from the foothills to above timberline. AK to Que. south in W. North America to WA, AZ, NM, and SD.

16. Poa stenantha Trin.

Trinius' Bluegrass

Forming tufts of basal leaves, this perennial has culms 20-40 cm (8-16 in) tall and glabrous foliage. The drooping leaf blades are flat and 1-2 mm wide. The 3- to 5-flowered spikelets are borne on arching branches of the open, drooping inflorescence. The glumes are 3-6 mm long, the second more than 1 mm longer than the first. The lemmas are 4-6 mm long and short-hairy on the back with longer hairs on the midvein and margins.

Rare in our area, collected once above Holoway Lake at 2530 m (8,300 ft) in The Bitterroot Mountains west of Florence. AK to OR, east to ID, MT, and CO.

Group VIII. These are bunch-forming species of medium height that occur in drier, more exposed habitats at high elevations.

7. Poa sandbergii Vasey

Sandberg's Bluegrass

This species, predominantly of low elevations can also be found in dry, exposed habitats at or above timberline. See description above.

8. Poa cusickii Vasey

Cusick's Bluegrass, Skyline Bluegrass

Both varieties of this species may occur up to timberline in our area. See description above.

17. Poa fendleriana (Steud.) Vasey

Mutton-grass

This tufted perennial has culms 20-50 cm (8-20 in) tall and mostly basal leaves. The stiff, folded or rolled leaf blades are 1-3 mm wide, the uppermost leaf with the blade reduced or lacking. The purplish or tawny, 4- to 6-flowered spikelets are borne on short, nearly erect or ascending branches of the narrow inflorescence. Male and female florets are mostly borne on separate plants, the females usually predominating. The glumes are 3-5 mm long, the second slightly longer and broader. The lemmas are 4-6 mm long with prominent, hairy nerves.

Mutton-grass is infrequent near or above timberline in the southern Bitterroot Mountains B.C. to CA, east to Man., CO, and TX.

This grass is similar to P. cusickii but can be distinguished by the wider leaf blades and hairy rather than roughened lemmas.

18. Poa scabrella (Thurb.) Benth.

Pine Bluegrass

Pine bluegrass forms bunches of numerous basal leaves and old leaf bases with culms 15-45 cm (6-18 in) tall and foliage that is rough to the touch. The folded or flat leaf blades are 1-3 mm wide. The 3- to 5-flowered spikelets are borne on short ascending or nearly erect branches of the narrow inflorescence. The glumes are 3-5 mm long, the second about 1 mm longer than the first. The lemmas are 4-5 mm long and short-hairy on the lower half.

Rare or infrequent in forest openings and meadows in the subalpine zones. Yuk. to CA, east to Alta., MI, and CO.

See note under P. canbyi.

Group IX. These bluegrasses are small tufted plants of dry habitats near or above timberline.

19. Poa incurva Scribn. & Will.

Curly Bluegrass

[P. sandbergii var. incurva]

This species forms small tufts of basal leaves with culms 10-20 cm (4-8 in) tall. The leaf blades are folded or rolled, 1-2 mm wide, and often slightly curled. The purplish or tawny, 3- to 5-flowered spikelets are borne on ascending branches of the narrow inflorescence. The glumes are unequal in length. The lemmas are hairy only at the base and are often slightly incurved at the tip.



m. *Poa nevadensis* n. *P. juncifolia* o. *P. nervosa* p. *P. alpina* q. *P. gracillima* r. *P. interior*

Curly bluegrass is locally common in dry, shallow soils of ridge tops and open slopes from the upper subalpine zone to above timberline. It can also occasionally be found on cliffs or cracks in bedrock at lower elevations. B.C. to CA, east to Alta. and WY.

This bluegrass is closely related to *P. sandbergii* and is considered to be the same species by many authorities. *P. incurva* can usually be distinguished by slightly broader leaf blades, green rather than purplish spikelets, and high elevation habitat.

20. *Poa pattersonii* Vasey

Patterson's Bluegrass

Patterson's bluegrass is a tufted perennial with culms up to 20 cm (8 in) tall. The mostly basal leaves have mainly flat blades 1-2 mm wide. The greenish to purple, 3- to 4-flowered spikelets are borne on ascending branches of the compact inflorescence. The glumes are nearly equal and about 3-4 mm long, the second glume about equal to the first lemma. The lemmas are about 4 mm long and mostly hairy on the midvein and margins. There is sometimes a tuft of long, tangled hairs at the base.

Infrequent near or above timberline in the Bitterroot Mountains Alta. south to NV, UT, and CO.

Patterson's bluegrass is very similar to *P. rupicola* and is best distinguished by the nearly equal second glume and first lemma.

21. *Poa rupicola* Nash

Timberline Bluegrass

This bluegrass forms small, dense tufts with culms 18-15 cm (3-6 in) tall. The short, stiff leaf blades are folded and 1-2 mm wide. The purplish, mostly 3-flowered spikelets are borne on short, ascending branches of the small inflorescence. The broad glumes are nearly equal and 2-4 mm long. The lemmas are about 3 mm long and hairy on the midvein and margins and sometimes short-hairy over the entire lower half.

Timberline bluegrass is uncommon in dry meadows and exposed ridge tops near or above timberline. It is found on all the major alpine summits in the Bitterroot Mountains without being common on any of them. Yuk. to CA, east to Alta., SD, CO, and NM.

22. *Poa lettermanii* Vasey

Letterman's Bluegrass

Letterman's bluegrass forms small tufts with culms up to 10 cm (4 in) tall and glabrous foliage. The mostly folded leaf blades are lax and about 1 mm wide. Few to several, purplish, 3- to 4-flowered spikelets are borne on short, nearly erect branches of the small, narrow inflorescence. The nearly equal glumes are about 3 mm long. The lemmas are glabrous and 2-3 mm long.

Our smallest bluegrass is rare on only the highest peaks in the Bitterroot Mountains. It has been collected at 2865-2955 m (9,400-9,700 ft) on Trapper and Chaffin peaks southwest of Darby. B.C. to CA, east to MT, WY, and CO.

Group X. These small to medium-size grasses are found in moist or wet habitats at high elevations in the mountains.

23. *Poa reflexa* Vasey & Scribn.

Nodding Bluegrass

Nodding bluegrass is a tufted perennial with glabrous foliage and culms 15-30 cm (6-12 in) tall that are often prostrate at the base and rooting at the nodes. The leaf blades are flat and 1-4 mm wide. The 3- to 5-flowered spikelets are borne on the ends of few, long, reflexed branches of the open inflorescence. The glumes are nearly equal and about 3 mm long. The lemmas are also about 3 mm long and short-hairy on the midvein and margins with long, tangled hairs at the base.

This distinctive species is infrequent in lush, moist meadows at 2345-2530 m (7,700-8,300 ft) in the southern Bitterroot Mountains. B.C. to OR and NV, east to MT and NM.

24. *Poa leptocoma* Trin.

Bog Bluegrass

This is a tufted grass with glabrous foliage and culms, mostly 10-20 cm (4-8 in) tall, that are prostrate at the base and root at the nodes. The soft, flat leaf blades are 2-3 mm wide. The dark purplish, 3- or 4-flowered spikelets are borne at the ends of spreading or drooping branches of the open inflorescence. The second glume is longer and broader than the first. The lemmas are 3-4 mm long with short hair on the midvein and margins and long, tangled hairs at the base.

Var. *leptocoma* is mostly 30-50 cm (12-20 in) tall and is rare in our area. The more common var. *paucispicula* (Scribn. & Merr.) Hitchc. is usually only 10-20 cm (4-8 in) tall is found in seepage areas and along small streams at 2620-2745 m (8,600-9,000 ft) on White Mtn. and below Chaffin Peak in the southern Bitterroot Mountains. AK to CA, east to MT, CO, and NM.

25. *Poa grayana* Vasey

Gray's Bluegrass

Gray's bluegrass is a rhizomatous perennial that forms tufts of mostly erect culms 15-30 cm (6-12 in) tall. The flat or folded leaf blades are 2-4 mm wide. The purplish, 3- to 5-flowered spikelets are borne



s. *Poa stenantha* t. *P. fendleriana* u. *P. scabrella* v. *P. pattersonii* w. *P. rupicola* x. *P. reflexa*

on ascending branches of the open, pyramidal inflorescence. The narrow glumes are 3-6 mm long, the second slightly longer than the first. The lemmas are 4-5 mm long and short-hairy on at least the lower half with long, tangled hairs at the base.

Found only at 2560-2680 m (8,400-8,800 ft) on Ward Mtn. southwest of Hamilton. B.C. to OR, east to Alta., UT, and NM.

Polypogon Desf. Polypogon, Beard-grass

Polypogon monspeliensis (L.) Desf.

Rabbit's-foot Grass

This annual grass forms bunches with culms, 5-50 cm (2-20 in) tall, that are often prostrate at the base and root at the nodes. The leaves have glabrous or roughened sheaths with free margins and flat blades 4-7 mm wide. The numerous, 1-flowered spikelets are borne on short, erect or ascending branches of the densely compact, spikelike, bristly inflorescence up to 10 cm (4 in) long. The flattened glumes are 2-4 mm long and about equal in length, each with an awn 6-10 mm long. The smooth, shiny lemmas are about 1-2 mm long with a short awn that is barely longer than the glumes.

This introduced species is uncommon in wet or vernal wet areas, often in standing water around ponds and streams in the valley zone in the northern part of our area. Introduced from Europe and common in w. North America.

Rabbit's-foot grass superficially resembles species of Setaria or Alopecurus but can be distinguished by the long-awned glumes. It is more common in areas of saline or alkaline soils.

Puccinellia Parl. Alkali Grass

The members of this genus are perennial, rhizomatous or bunch-forming grasses with leaves that have open or partly closed sheaths and narrow blades. The several-flowered spikelets are borne on the ends of spreading to nearly erect branches of the open or compact inflorescence. The awnless glumes are unequal in length, rounded on the back, and shorter than the lowest lemma. The awnless lemmas are rounded on the back and often distinctly nerved.

These plants resemble species of Glyceria but they often have narrower leaves and are distinguished by 3-nerved rather than 1-nerved second glumes. Members of Puccinellia can be distinguished from grasses in the genus Poa by not having prolike leaf tips.

1. Plants rhizomatous and often rooting at the lower nodes, occurring in the montane and subalpine zones.....(3) P. pauciflora
1. Plants forming bunches, occurring in the valleys and foothills.....2
2. Lower branches of inflorescence reflexed; lemmas mostly <2 mm long.....(1) P. distans
2. Branches of inflorescence spreading but usually not reflexed; lemmas >2 mm long.....(2) P. nuttalliana

1. Puccinellia distans (L.) Parl.

Weeping Alkali Grass

Weeping alkali grass is a tufted perennial with culms 10-40 cm (4-14 in) long and flat or rolled leaf blades 1-4 mm wide. The 5- to 6-flowered spikelets are borne on the ends of spreading or (the lower ones) reflexed branches of the open inflorescence. The broad glumes are 1-2 mm long, the second about 0.5 mm longer than the first. The lemmas are 1-2 mm long with broadly rounded tips and sparsely hairy bases.

This plant occurs in scattered, small colonies in vernal wet, disturbed soil in the valleys. Native to Eurasia and introduced in much of Can. and n. and w. U.S.

2. Puccinellia nuttalliana (Schult.) A.S. Hitchc.

Nuttall's Alkali Grass

This bunch-forming grass has culms 40-80 cm (16-32 in) tall and rolled leaf blades 1-3 mm wide. The 4- to 7-flowered spikelets are borne on the ends of long, spreading branches of the open inflorescence. The nearly equal glumes are 1-3 mm long. Lemmas are about 2-3 mm long with a broadly rounded tip.

This species is rare to infrequent in open, vernal wet habitats in the valleys. B.C. to CA, east to Sask., WI, KS, NM, and n. Mex.

Nuttall's alkali grass is very similar to P. distans, but it usually does not have reflexed inflorescence branches.

3. Puccinellia pauciflora (Presl) Munz

Weak Alkali Grass

Weak alkali grass is a rhizomatous perennial with culms, 15-60 cm (6-24 in) tall, that are often prostrate at the base and root at the nodes. The leaves have sheaths with cross-partitions and flat blades 3-12 mm wide. The 3- to 7-flowered spikelets are borne on the ends of spreading or ascending branches of the loosely open inflorescence. The broad glumes are 1-2 mm long, the second about 0.5 mm longer than the first. The conspicuously 5-nerved lemmas are 2-3 mm long with a purplish band below the papery, blunt, shallowly toothed tip.

This species is locally common, mostly growing in moss, in permanently wet meadows and stream margins at 2105-2285 m (6,900-7,500 ft) in the Bitterroot Mountains AK to CA, east to Alta., SD, CO, and NM.



y. *Poa leptocoma* z. *P. grayana* a. *Polypogon monspeliensis* b. *Puccinellia distans* c. *P. nuttalliana*
 cc. *Poa lettermannii*

Schizachne Hack. False MelicSchizachne purpurascens (Torr.) Swallen

False Melic

False melic is a glabrous, tufted perennial with culms, 30-70 mm tall, that are often curved at the base. The leaves have closed sheaths, and the flat blades are 2-3 mm wide. The few to several 3- to 6-flowered spikelets are borne on the ends of few spreading or drooping branches of the open inflorescence. The upper 1-2 florets of each spikelet are reduced to sterile lemmas. The purplish glumes are 5-7 mm long, the second about 2 mm longer than the first. Lemmas are about 10 mm long with an awn about as long from the 2-toothed tip and a tuft of long hairs at the base.

This species is infrequent in open forests of montane and lower subalpine ridges. AK to B.C. and through the Rocky Mountains to n. Mex., east to Can. and ne. U.S.; Asia.

Secale L. RyeSecale cereale L.

Rye

Rye is a winter annual with culms up to 150 cm (60 in) tall and leaves that have open sheaths and flat blades 4-10 mm wide. The 2-flowered spikelets are sessile and 1 per node in a terminal spike 8-15 cm (3-6 in) long. The slender glumes are stiff and smaller than the bodies of the lemmas. The lemmas have an awn 4-7 cm (2-3 in) long and short hairs on the midvein and margins.

Common cultivated rye is rare in our area, occasionally occurring along highways and railroads. Introduced throughout most of temperate North America.

Setaria Beauv. Bristlegrass, Foxtail

These are introduced, annual grasses with leaves that have open sheaths and flat, folded, or rolled blades. The 2-flowered spikelets, each subtended by 1-several barbed bristles, are borne on very short, crowded branches of the narrow, spikelike inflorescence. The papery glumes are unequal in length, the first much shorter than the second. The lower lemma is sterile or with stamens only, while the upper has both male and female parts and is cross-wrinkled when mature.

1. Each spikelet subtended by 2-3 bristles >3 times as long.....(1) S. viridis
1. Each spikelet subtended by 5-10 bristles <3 times as long.....(2) S. lutescens

1. Setaria viridis (L.) Beauv.

Green Bristlegrass or Foxtail

Green bristlegrass branches has several culms up to 100 cm (40 in) tall that are erect or curved at the base. The foliage is mostly glabrous, and the leaf blades are 4-11 mm wide. Each spikelet, 3-4 mm long, is subtended by 2-3 bristles more than 3 times as long. The spikelike inflorescence is up to 10 cm (4 in) long. The fertile lemma and palea are nearly enclosed by the second glume and sterile lemma.

Locally common in disturbed soil of fields, roadsides, and waste area in the valley zone. Native to Europe and widespread in temperate North America.

2. Setaria lutescens (Weigel) Hubb.
[S. glauca (L.) Beauv.]

Yellow Bristlegrass or Foxtail

This grass is similar in most respects to the former species, but each spikelet is subtended by more than 4 bristles that are less than 3 times its length. The leaf blades are often twisted in a loose spiral.

Yellow bristlegrass is rare in waste areas in the northern part of our area. Native to Europe and introduced into much of temperate North America.

Sitanion Raf. SquirreltailSitanion hystrix (Nutt.) Smith

Squirreltail

[Elymus elynoides (Raf.) Swezey]

Squirreltail is a perennial bunch grass with mostly erect culms 10-50 cm (4-20 in) tall and leaves with open sheaths and flat to rolled blades 1-4 mm wide. The foliage is usually covered with short, appressed hairs. The 1- to 6-flowered, sessile spikelets are usually 2 per node of the terminal spike, but often 1 or 2 of them are reduced. The axis of the spike is easily broken at the nodes. The narrow glumes taper to a point or into 2-several spreading awns 3-10 cm long. The hairy or roughened lemmas taper into an awn about as long as the glumes. Often 1-several of the lower lemmas are sterile and glumelike as are the lemmas of the sterile florets.

This species is infrequent in dry, open habitats from the valleys to timberline. It is most common at 2135-2805 m (7,000-9,200 ft) in the Bitterroot Mountains and in the subalpine zones of the Sapphire Range. B.C. to CA, east to Alta., SD, OK, and n. Mex.



d. *Puccinellia pauciflora* e. *Schizachne purpurascens* f. *Secale cereale* g. *Setaria lutescens*

The characteristics of the spikelets are highly variable and often confusing. S. hystrix could be confused with Agropyron scribneri, but the latter tends to be prostrate. It could also be confused with Hordeum jubatum which has nodding rather than erect spikes.

Sorghum Moench Sorghum

Sorghum bicolor (L.) Moench
[S. vulgare Pers.]

Sorghum

An annual grass with culms up to 100 cm (40 in) tall and leaves with flat or folded blades up to 10-20 mm wide and sheaths with free margins. The 1-flowered spikelets are borne in 2's or 3's at the ends of ascending branches in a diffuse, open inflorescence. One spikelet has both male and female parts, while the other 1 or 2 have stamens only. The hardened, shiny glumes are about 6 mm long, longer than the lemmas. The lemma of the perfect spikelet has an awn that is easily broken off, while the staminate lemmas are unawned.

This tropical species is grown as a source of sugar and livestock feed. It was collected along the railroad tracks just east of Missoula. Introduced but rarely persistent in much of the U.S. (Not illustrated).

Spartina Schreb. Cordgrass

Members of this genus are rhizomatous perennials with leaves that have flat or rolled blades and sheaths with open margins. The 1-flowered, sessile spikelets are congested in 2 rows on 2-many 1-sided spikes. These spikes are held erect in the narrow, interrupted inflorescence. The glumes are unequal in length, and the lemmas are either shorter or longer than the second glume. Both the lemmas and glumes are flattened with a ridged midvein.

1. Leaf blades up to 5 mm wide; glumes with long hairs on the midvein.....(1) S. gracilis
1. Leaf blades 5-15 mm wide; glumes without long hairs.....(2) S. pectinata

1. Spartina gracilis Trin.

Alkali Cordgrass

The solitary, erect culms of this species are 40-100 cm (16-40 in) tall. The rolled leaf blades are up to 5 mm wide, and the sheaths have sparse long hairs at the top. There are mostly 4-8 spikes in the narrow inflorescence. The glumes have long hairs on the midvein and are 5-9 mm long, the second 2-3 mm longer than the short-awned first. The lemmas are unawned and nearly as long as the second glume.

Alkali cordgrass was found growing with Distichlis in a remnant meadow south of Florence. B.C. to CA, east to Sask., KS, and NM.

2. Spartina pectinata Link

Prairie Cordgrass

Prairie cordgrass is 80-150 cm (32-60 in) tall and has leaves with sheaths that have a ring of hairs at the top and rolled blades 5-15 mm wide. The inflorescence has 6-30 spikes. The glumes are 6-9 mm long, the second with a 2-4 mm awn and about 2 mm longer than the awn-tipped first. The lemmas are about 8 mm long.

Collected just north of Lolo on the east side of the Bitterroot River. WA and OR, east to Newf., NC, and TX.

Sphenopholis Scribn. Wedgegrass

Sphenopholis obtusata (Michx.) Scribn.

Prairie Wedgegrass

Tufted perennial grass, up to 80 cm (32 in) tall, with glabrous, soft-hairy or rough-textured sheaths. The blades are flat, soft-hairy or rough-textured, 3-5 mm broad. Panicle 5-15 cm long, narrow and dense, spike-like. Spikelets are 2 (1-3) flowered, unawned, the rachilla prolonged beyond the upper floret. The glumes are scabrous, nerved, prominently keeled and compressed. The first glume is very narrow and acute, the second 3-4 times broader and strongly flattened.

B.C. to CA and Mex., e to ME and FL.

Sporobolus R. Br. Dropseed

Sporobolus cryptandrus (Torr.) Gray

Sand Dropseed

Sand dropseed is a tuft-forming perennial with erect or spreading stems, 30-100 cm (1-3 ft) tall, that are grooved along their length. The leaves have rolled blades, 2-5 mm wide, and glabrous sheaths with a ring of long, dense, spreading hairs at the top. The inflorescence is 10-20 cm (4-8 in) long with erect or spreading branches that bear spikelets nearly to the base. The inflorescence is often partly enclosed



h. *Setaria viridis* i. *Sitanion hystrix* j. *Spartina gracilis* k. *S. pectinata*

by the uppermost leaf sheath. The 1-flowered spikelets are 2-3 mm long. The outer glume is 1/2 as long as the inner, and both the glumes and lemmas are awnless.

Collected on a dry ridge northeast of Victor. B.C. to CA, east to s. Can. and most of the U.S. (Not illustrated).

Stipa L. Needlegrass

The needlegrasses are bunch-forming perennials with leaves that have mostly rolled blades and sheaths with free margins. The 1-flowered spikelets are borne on the ends of short, erect or long and spreading branches of the open or contracted inflorescence. The sharp-pointed, papery glumes are nearly equal. The lemmas are nearly cylindrical, prolonged into a twisted awn, and have a tuft of long hairs at the sharp-pointed base.

1. Awns >10 cm long; glumes >15 mm long.....(3) S. comata
1. Awns mostly <6 mm long; glumes <15 mm long.....2
2. Spikelets borne on long spreading branches of an open inflorescence.....(4) S. richardsonii
2. Spikelets borne on short, erect branches in a narrow inflorescence.....3
3. Leaf sheaths with small tufts of hair at the top; hardened base of lemmas short and not very sharp.....(2) S. viridula
3. Leaf sheaths without distinct tufts of long hairs at the top; hardened base of lemmas prolonged, curved, and sharp-pointed.....(1) S. occidentalis

1. Stipa occidentalis Thurb.
[S. nelsonii Scribn.]

Western Needlegrass

Western needlegrass forms dense bunches with culms up to over 100 cm (40 in) tall. The foliage is glabrous to hairy. The leaf blades are strongly rolled and 1-5 mm wide. Spikelets are borne on short, nearly erect branches of the narrow inflorescence. The glumes are 7-15 mm long. The slender floret is 5-8 mm long and soft-hairy with a twice-bent awn 15-50 mm long.

Var. occidentalis has awns that are long-hairy on the lower half. It is locally common in grasslands, meadows, and forest openings from the valleys to the upper subalpine zone. Var. minor (Vasey) Hitchc. has nearly glabrous awns and is infrequent in open or partially shaded habitats near or above timberline. It was collected at 2745 m (9,000 ft) on White Mtn. and 2530 m (8,300 ft) above Chaffin Lakes in the southern Bitterroot Mountains Yuk. to CA, east to Sask., SD, TX, and n. Mex.

2. Stipa viridula Trin.

Green Needlegrass

Similar to S. occidentalis, this species has culms up to 100 cm (40 in) tall and glabrous or sparsely hairy foliage. The leaves have strongly rolled blades 3-6 mm long and sheaths with small tufts of long hairs at the top. The spikelets are borne on short, erect branches of the narrow inflorescence. The papery, sharp-pointed glumes are 9-12 mm long. The plump floret is about 5-6 mm long and 1 mm thick. The twice-bent awn is 25-35 mm long and nearly glabrous.

Green needlegrass is infrequent in fine-textured soils of moist grasslands on nearly level ground below the foothills of the Sapphire Range. B.C. to AZ, east to Sask., IL, and NM.

This species can be distinguished from S. occidentalis by the small tufts of long hairs at the top of the leaf sheaths and the plumper floret often greater than 1 mm broad. The lemma of S. occidentalis has a long, sharp-pointed base, while that of S. viridula is short and blunt.

3. Stipa comata Trin. & Rupr.

Needle and Thread

Needle and thread forms bunches with culms up to 60 cm (24 in) tall and glabrous or hairy foliage. The rolled leaf blades are 1-2 mm wide. The spikelets are borne on nearly erect branches in a contracted inflorescence up to 20 cm (8 in) long. The narrow glumes are nearly equal and 15-25 mm long. The sparsely hairy floret is 8-12 mm long with a long, curved, sharp-pointed base. The slender, twisted awn is up to 15 cm (6 in) long.

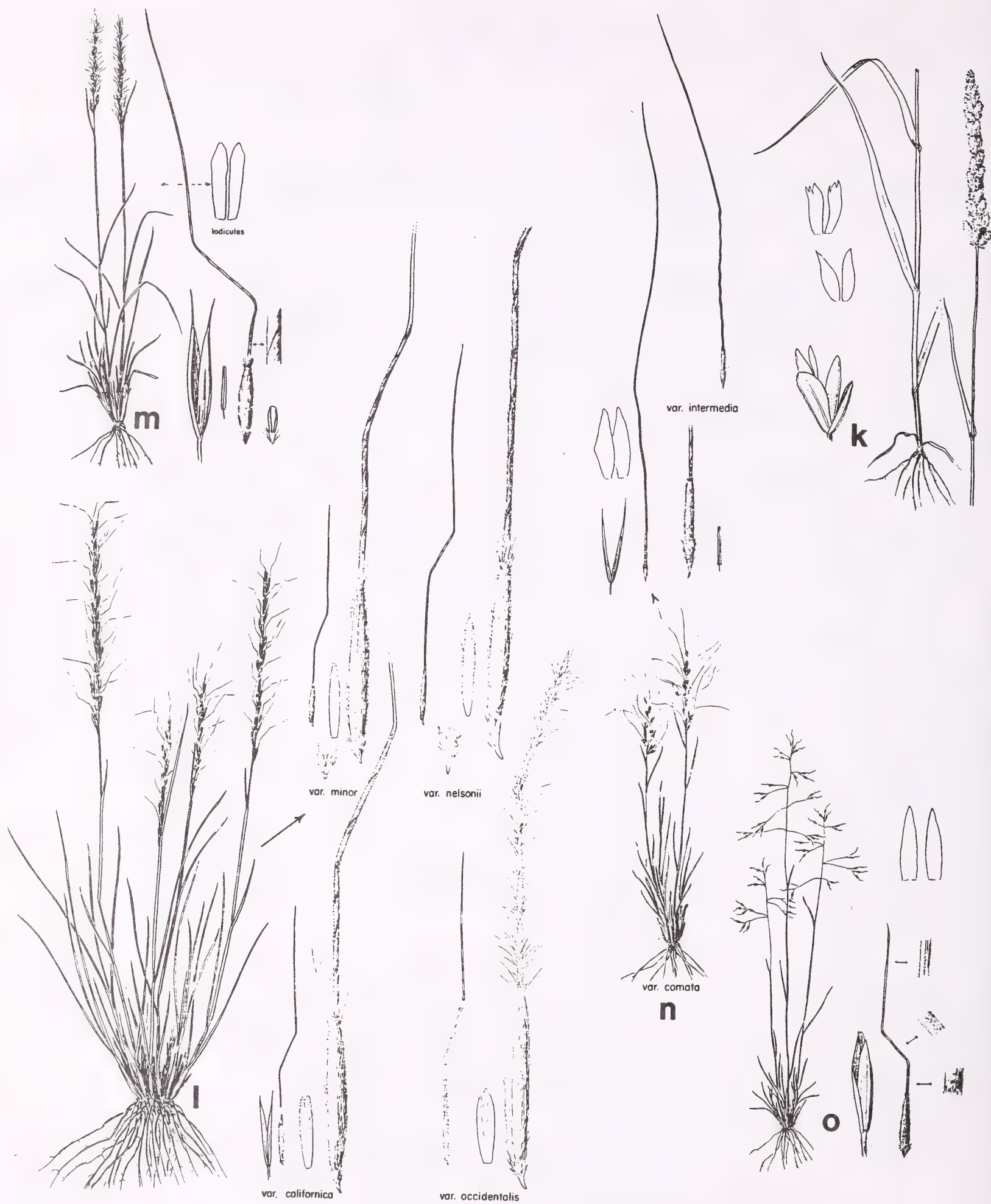
Locally common in dry grasslands of the Missoula Valley south of town and in the foothills of the Sapphire Range. B.C. to CA, east to Ont., IN, and TX.

4. Stipa richardsonii Link

Richardson's Needlegrass

This is a tufted grass with culms 40-100 cm (16-40 in) tall and glabrous or slightly hairy foliage. The folded or rolled leaf blades are 1-3 mm wide. The few, purplish spikelets are borne at the ends of long, spreading or drooping branches in the open inflorescence. The glumes are 8-10 mm long, the second shorter than the first. The floret is 5-6 mm long and sparsely hairy with a short, hardened base. The twice-bent awn is 18-25 mm long.

Richardson's needlegrass is sparsely distributed at the margins of ponderosa pine forests in the foothills of the Bitterroot and Rattlesnake ranges. B.C. and e. WA, east to Sask., SD, and CO.



k. *Sphenopholis obtusata* l. *Stipa occidentalis* m. *S. viridula* n. *S. comata* o. *S. richardsonii*

Trisetum Pers. Trisetum, Oatgrass

Members of this genus are usually tufted perennials with leaves that have open sheaths and flat to slightly rolled blades. The mostly 2- to 3-flowered spikelets are borne on drooping to nearly erect branches of open or contracted and spikelike inflorescences. The glumes are either equal or very unequal in length and shorter or longer than the lowest lemma. The lemmas have a ridgelike midvein and are 2-lobed at the tip, usually with a tuft of hairs at the base and a bent awn. The small stalk that bears the florets within each spikelets (rachilla) is often long-hairy.

1. Spikelets borne on spreading or drooping branches of the open inflorescence.....(3) T. cernuum
1. Spikelets borne on ascending or erect branches in narrow inflorescences.....2
2. Lemmas awnless or with a short, straight awn <7 mm.....3
2. Lemmas with a bent awn >7 mm long.....4
3. Awn, if any, no greater than 2 mm.....(2) T. wolfii
3. Awn mostly 5-6 mm long.....(5) T. orthochaetum
4. Glumes nearly equal in length; inflorescence dense and spikelike, common.....(1) T. spicatum
4. Second glume noticeably shorter than the first; inflorescence narrow but more open; uncommon in our area.....(4) T. canescens

1. Trisetum spicatum (L.) Richter

Downy Trisetum or Oatgrass

Downy oatgrass forms small tufts with culms 8-50 cm (3-20 in) tall and rough-textured to densely long-hairy foliage. The folded to flat leaf blades are 1-4 mm wide. The purplish, tawny, or silvery 2-flowered spikelets are borne on short, erect branches of the congested, spikelike inflorescence. The thin glumes are 3-6 mm long, the second longer and broader than the first and usually longer than the lowest lemma. The lemmas are 4-5 mm long with a strongly bent awn 5-6 mm long.

This species occurs in grasslands, meadows, and rocky slopes from the foothills to near or above timberline where it is much more common. Circumpolar arctic-alpine, south in W. North America to Mex.; South America, Antarctica, Australia.

2. Trisetum wolfii Vasey

Wolf's Trisetum

This grass is loosely tufted, often with short rhizomes. The culms are 30-60 cm (12-24 in) tall with roughened or sparsely hairy foliage and flat leaf blades that are 2-4 mm wide. The purplish spikelets are borne on nearly erect branches of a narrow, often interrupted inflorescence. The glumes are 4-7 mm long, the second about 1 mm longer than the first and longer than the lowest lemma. The unawned, blunt-tipped lemmas are 4-6 mm long with a minutely hairy base.

Wolf's trisetum is locally common in moist to wet subalpine meadows of the Sapphire and Rattlesnake ranges and to a lesser extent in the Bitterroot Mountains WA to CA, east to Alta., MT, and NM.

3. Trisetum cernuum Trin.

Nodding Trisetum

Nodding trisetum forms small tufts with slender culms 30-100 cm (12-40 in) tall and glabrous to hairy foliage. The flat leaf blades are 5-10 mm wide. The spikelets usually contain 2-3 fertile florets below 1 or 2 sterile, reduced lemmas. They are borne on the ends of long, spreading or drooping branches of the open inflorescence. The glumes are 1-4 mm long, the second broader and about 2 mm longer than the first although shorter than the lowest lemma. The fertile lemmas are 5-6 mm long with short hairs at the base and a awn about 10 mm long.

This grass is infrequent in moist, open montane forests. AK to CA, east to Alta., MT, and ID.

4. Trisetum canescens Buckl.

Tall Trisetum

This tufted perennial has culms 50-100 cm (20-40 in) tall and mostly hairy foliage. The flat leaf blades are 5-10 mm wide. The mostly 3-flowered spikelets are borne on short, ascending branches in the loose, narrow inflorescence. The glumes are mostly 3-6 mm long, the second broader and 2 mm longer than the first and shorter than the lowest lemma. Lemmas are 5-7 mm long with short hairs at the base and a bent awn 10-14 mm long.

In our area tall trisetum is rare in moist to dry, open to partially shaded habitats in the lower mountains. B.C. to CA, east to Alta., MT, and ID.

5. Trisetum orthochaetum A. S. Hitchc.

Lolo Trisetum

Lolo trisetum is tufted, sometimes with short rhizomes, and the culms are up to more than 100 cm (40 in) tall. Foliage is glabrous, and the flat leaf blades are 4-7 mm wide. The purplish-brown, mostly 3-flowered spikelets are borne on the ends of ascending branches of the narrow, slightly nodding inflorescence. The glumes are 5-7 mm long, the second about 1 mm longer than the first and equal to the lowest lemma. The lemmas are about 6 mm long with a nearly straight awn 5-6 mm long.

Wet meadows in the lower subalpine zone. Known only from Missoula County, MT.

HYDROCHARITACEAE

First discovered by Agnes Chase in 1908 at Lolo Hot Springs and recollected at this site in 1951 by LeRoy Harvey. Subsequent searching failed to locate the plant, and it is presumed extinct at this site. In 1985 J. Stephen Shelly discovered another population about 3 miles southwest of Lolo Hot Springs in the Granite Creek drainage. This species is believed to be a sterile hybrid between T. wolfii and T. canescens.

Triticum L. Wheat

Triticum aestivum L.

Wheat

Wheat is an annual or winter annual with clustered culms up to 150 cm (60 in) tall. The leaves have flat blades 5-20 mm wide and sheaths with free margins. The 2- to 5-flowered, sessile spikelets are borne singly at the nodes of a dense spike. The narrow glumes are sharp-pointed or with 1-several awns. The lemmas are also sharp-pointed or long-awned.

Wheat plants can often be found growing along highways and railroads where it does not persist. Native of Eurasia and found throughout temperate North America.

HYDROCHARITACEAE Frog's-bit Family

Elodea Richard Waterweed, Ditchmoss

These submersed, aquatic perennials have narrow, sessile, 1-nerved leaves, mostly in whorls of 3 and lax, floating stems that often form roots at the nodes. Flowers are mostly unisexual with different sexes on different plants (dioecious), but occasional plants with both sexes or bisexual flowers may be encountered. Each minute flower has 3-9 stamens, 1 style, and 3 sepals and may or may not have 3 petals. Sepals and petals join with the top of the ovary to form a tubular hypanthium. Flowers originate from a leaflike bract in the axils of leaves but float toward the surface of the water attached by a long, slender stalk that is actually an elongation of this hypanthium. The fruit is a few-seeded capsule.

1. Leaves mostly ca. 2 mm wide with blunt tips; common.....(1) E. canadensis
1. Leaves mostly <1.5 mm wide, tapered to a slender point; rare.....(2) E. nuttallii

1. Elodea canadensis Richard

Canada Waterweed

Canada waterweed has stems up to 1 m (3 ft) long and crowded, blunt-tipped leaves that are 5-10 mm long and 1-4 mm wide. The leaf-like bract subtending the male flowers is 11-13 mm long, narrowed at the base, and 2-lobed at the tip. Male flowers lack petals, and sepals are 3-5 mm long. Sepals of the female flowers are 2-3 mm long with slightly longer petals. Capsules are 6 mm long.

Common and widespread in still or slow-moving waters of sloughs, ponds, and rivers in the valley zone. B.C. to Que., south to CA, CO, OK, and VA.

2. Elodea nuttallii (Planch.) St. John

Nuttall's Waterweed

This species has branched stems up to 50 cm (20 in) long with sharp-pointed leaves about 6 mm long and 1-2 mm wide. The leaves are less crowded than in E. canadensis except near the tip of the stem. The leaflike bract subtending the male flowers is about 2 mm high and nearly round with a point at the top. Sepals and petals are 1-2 mm long. The male flowers are released from the plant and free-floating at maturity. Capsules are 5-7 mm long.

Nuttall's waterweed is rare in our area, collected once in northeast Ravalli County. B.C. to CA, east to ME and VA. (Not illustrated).

IRIDACEAE Iris Family

Our members of this family are perennials with narrow, grasslike leaves and thick rhizomes or fibrous roots. The 1-few stalked, bisexual flowers subtended by large, leaflike bracts are borne in open inflorescences. The bisexual flowers have 3 petals and 3 petal-like sepals joined on top of the ovary. The style is 3-lobed, and the fruit is a 3-angled capsule.

1. Petal-like sepals larger than petals and reflexed; flowers irislike.....Iris
1. Sepals and petals similar in size and shape; flower star-shaped.....Sisyrinchium

Iris L. Iris

Iris pseudacorus L.

Yellow Iris

Yellow iris has leafy stems up to 1 m (3 ft) tall and thick, fleshy rhizomes. The mostly basal leaves are linear and up to 90 cm (3 ft) long. The branched inflorescence has a few yellow flowers. The 3 egg-shaped sepals are reflexed and up to 5 cm (2 in) long, while the petals are shorter and narrower. Both



p. *Trisetum spicatum* q. *T. wolfii* r. *T. cernuum* s. *T. canescens* t. *T. orthochaetum* u. *Triticum aestivum*

JUNCACEAE

are united below into a narrow tube about 12 mm long mounted on top of the ovary. The petal-like branches of the style are about 2 cm (1 in) long. The capsule is 5-8 cm (2-3 in) long.

This European species has long been established in the Flathead region to the north and has recently been reported from a slough south of Darby.

In addition to this species, *Iris missouriensis* Nutt., the native blue Rocky Mountain iris, occurs in wet meadows in many adjacent counties and could be in our area as well. (Not illustrated).

Sisyrinchium L. Blue-eyed Grass

Sisyrinchium angustifolium Mill.

Blue-eyed Grass

[S. montanum Greene]

Blue-eyed grass has fibrous roots, tufts of basal leaves, and flattened, wing-margined stems 10-25 cm (4-10 in) tall. The mostly basal leaves have overlapping bases and are shorter than the stems. The 2-5 blue flowers are subtended by 2 leaflike bracts at the top of the stems. Petals and sepals are similar, forming a star-shaped flower about 3-4 cm across with a yellow center. The nearly round capsule is 4-6 mm long.

Locally common in moist to wet meadows in the valley and montane zones. AK to Baja Cal., east to Alta., WY, and NM.

JUNCACEAE Rush Family

Members of this family are grasslike annual or (mostly) perennial plants with solid, rounded or flattened stems and basal or alternate leaves. The leaves may be flat, folded (equitant), or round, and they taper to a point, sometimes with cross partitions (septae) and often with sheaths that form pointed or rounded projections (auricles) at the base of the blade. The small flowers have 6 tepals (undifferentiated sepals and petals), 3 or 6 stamens, and a single 3-parted ovary with 3-many seeds.

1. Seeds many per capsule; leaves usually with open sheaths and hairless blades.....Juncus
1. Seeds 3 per capsule; leaves with closed sheaths and often with marginal hairs.....Luzula

Juncus L. Rush

Rushes are annual or (usually) perennial, glabrous, grasslike plants from fibrous roots or rhizomes. The simple stems are round or flattened. The alternate leaves have bases that sheath the stem; the sheaths are usually open at the top and often form projections (auricles) at the base of the blade. The blades are flattened or round, sometimes partitioned by cross walls (septae). The inflorescence is headlike or, more often, open and branched. Flowers are often subtended by 1-2 small bracts and consist of 6 tepals (undifferentiated petals and sepals), 3 or 6 stamens, and a 3-parted ovary with many seeds.

1. Plants fibrous rooted annuals; flowers borne much of the length of the mostly branched stems.....(1) J. bufonius
1. Plants perennials, mostly rhizomatous; inflorescence borne at the top of the stem.....2
2. Inflorescence subtended by an erect, needlelike bract that appears to be part of the stem; the inflorescence thus seems to be borne on the side of the stem rather than at the end.....3
2. Bract(s) of the inflorescence not appearing to be a continuation of the stem, inflorescence obviously terminal.....7
3. Inflorescence usually with <8 flowers, bract subtending inflorescence usually < 5 cm long.....4
3. Inflorescence usually with >8 flowers, bract usually >5 cm long.....5
4. Mature capsule distinctly pointed on top; bract of inflorescence 2-4 times as long as inflorescence.....(7) J. parryi
4. Mature capsule rounded and notched on top; bract ca. the same length as the inflorescence.....(6) J. drummondii
5. Bract of the inflorescence at least 1/2 as long as the stem; inflorescence thus appears to be borne near the middle of the stem.....(8) J. filiformis
5. Bract usually much <than 1/2 the length of the stem; inflorescence appears to be borne near the top of the stem.....6
6. Stamens 3; mature capsules mostly smaller or equal to the tepals; stems >30 cm (12 in) tall.....(9) J. effusus
6. Stamens 6; mature capsules mostly smaller than the tepals; stems <50 cm (20 in) tall.....(5) J. balticus

7. Stems strongly flattened; leaves folded and flattened along the long axis.....(19) J. ensifolius
7. Stems round or slightly flattened; leaves flat or round in cross section.....8
8. Leaves flat and grasslike.....9
8. Leaves needlelike and round in cross section.....11
9. Some of the stem leaves at least equalling the inflorescence.....(12) J. covillei
9. Stem leaves <the inflorescence.....10
10. Outer 3 tepals somewhat longer, more pointed, and with narrower margins than the inner 3; seeds with long appendages on the ends.....(11) J. regelii
10. Tepals all similar; seeds with minute points on the ends but not appendaged.....(10) J. longistylis
11. Inflorescence consisting of many-flowered heads at least 1 cm broad.....12
11. Inflorescence of smaller flower heads usually less than 1 cm wide.....13
12. Inflorescence of a solitary, dark brown head; montane and above.....(13) J. mertensianus
12. Inflorescence of usually >1 green or light brown heads; valleys.....(18) J. torreyi
13. Tepals 2-3 mm long.....14
13. Tepals >3 mm long.....15
14. Branches of inflorescence erect; mature capsule rounded on top.....(16) J. alpinus
14. Branches of inflorescence spreading; mature capsules tapered to a pointed tip.....(17) J. articulatus
15. Mature capsule tapered to long point; some leaves exceeding the inflorescence.....(14) J. nodosus
15. Mature capsule rounded on top with a small point; leaves not exceeding the inflorescence.....(15) J. nevadensis

Group I. This group contains the only annual rush in our area.

1. Juncus bufonius L.

Toad Rush

Toad rush is a tufted plant with stems, usually less than 20 cm (8 in) tall, that commonly branch from the base. The leaves are flat or rolled inward and often less than 1 mm wide. The open inflorescence occupies almost the entire length of the stems and consists of 1-3 sessile flowers congested at the nodes or in the leaf axils. Tepals are 3-7 mm long and papery on the margins with pointed tips. The seeds are elliptical with a small point at each end.

Common in vernal wet or moist, open soil in the valley and montane zones. It often occurs as a weed in irrigated fields and gardens. Widespread in North America and Eurasia.

Group II. These 3 similar, perennial species form tufts from fibrous roots and have 1-2 bracts that are longer than the inflorescence.

2. Juncus tenuis Willd.

Slender Rush, Trail Rush

This rush has stems that are 15-60 cm (6-24 in) tall and flat or inrolled leaves clustered near the base of the plant. The pale-colored auricles are short and thickened or thin and pointed. The branched inflorescence is open or congested. The greenish or brownish tepals have a yellowish margin and a greenish or brownish midvein, and they taper to a sharp point. The mature capsules often have a small notch on the top. The seeds are elliptical with a small point at each end.

Var. dudleyi (Wieg.) Herm. has thickened, yellow to brown auricles and a congested inflorescence. Var. congestus Engelm. has thin, greenish or whitish auricles and a congested inflorescence. Var. tenuis has an open inflorescence and thin, white or green auricles.

Slender rush is common in hay meadows and other moist, slightly disturbed, open habitats in the valley and is often encountered in moist, partially shaded areas along trails and roads in the montane zone. Widespread in North America, South America, Europe, and Australia.

3. Juncus interior Wieg.

Inland Rush

Inland rush is very similar to J. tenuis (No. 2) but can be distinguished by having purplish or pinkish leaf sheaths and very short, rounded auricles.

Collected once in Ravalli County and is perhaps introduced in our area. Southern Can., south to AZ, NM, CO, and NE. (Not illustrated).

4. Juncus confusus Cov.

Colorado Rush

This species has stems 30-50 cm (12-20 in) tall and channelled leaf blades, less than 1 mm broad, that may be 2/3 the length of the stem. The whitish, papery auricles are less than 1 mm long and pointed at



y. *Elodea canadensis* z. *Sisyrinchium angustifolium* a. *Juncus bufonius* b. *J. tenuis* c. *J. confusus*

the tip. The few-flowered inflorescence is compact and much shorter than the narrow, leaflike bract that subtends it. The light brown tepals are lance-shaped with a pointed or blunt tip and have a green midvein and papery margins. The 3-sided capsule has concave sides and a notched top. Seeds are broadly elliptical with one concave end.

Colorado rush is common in wet meadows along the rivers and major creeks. It may be easily overlooked because it often occurs with the similar and more common *J. tenuis*. This species has been collected several times along Lolo Creek and the upper Bitterroot River valleys. B.C. to CA, east to Alta. and CO.

Group III. These perennial rushes have leaf sheaths without blades or with blades reduced to bristlelike scales. The large bract at the base of the inflorescence is cylindrical and erect. The bract thus appears to be a continuation of the stem, and the inflorescence appears to be borne on the side of the stem.

5. *Juncus balticus* Willd.

Baltic Rush, Wire Rush

Baltic rush has needle-shaped stems, 30-50 cm (12-20 in) tall, arising singly from long, thick, creeping rhizomes. The branched inflorescence is open or congested and subtended by a needle-shaped bract 5-20 cm (2-8 in) long. The lance-shaped tepals are 4-6 mm long and greenish to dark brown with a green midvein. The outer 3 tepals are longer and more sharp-pointed than the inner 3. The mature capsules are pointed at the tip. Seeds are elliptical with a small point at each end.

Var. *montanus* Engelm. has a compact inflorescence and tepals that are 5-6 mm long. Var. *vallicola* Rydb. has a diffusely branched inflorescence and tepals that are mostly 4-5 mm long. This species is abundant in wet meadows of the Bitterroot Valley and is common in open, wet habitats up to the lower subalpine zone. Widespread in temperate and boreal North America, South America, and Eurasia.

At a distance, Baltic rush turf can be told by the brownish green color that contrasts with the lighter green of the grasses and sedges.

6. *Juncus drummondii* E. Mey.

Drummond's Rush

Drummond's rush forms dense tufts or small mats with needle-shaped stems 10-30 cm (4-12 in) tall. The basal leaf sheaths are 2-6 cm (1-2 in) long and bladeless or with a small bristle at the top. The inflorescence consists of 1-30 closely aggregated flowers subtended by a needlelike bract that is about as long as the inflorescence. The green tepals are 5-7 mm long and lance-shaped with thin brown margins and a pointed tip. Each flower is subtended by 2 thin, brownish bracts. The mature capsule has a rounded and notched top. The seeds are narrowly elliptical with a membranous appendage as long as the seed at each end.

Var. *subtriflorus* (E. Mey.) Hitchc. has mature capsules that are about 1 mm longer than the tepals. The more common var. *drummondii* has mature capsules that are about the same height as the tepals.

This species is common on moist slopes and meadows in the subalpine zones and is locally abundant on upper north slopes of high alpine ridges where it is often associated with *Carex pyrenaica* and *Juncus mertensianus*. AK to CA, east to Alta. and NM.

7. *Juncus parryi* Engelm.

Parry's Rush

This tufted species is similar in appearance to *J. drummondii* (No. 6) but can be distinguished by the presence of an uppermost leaf blade at least 2 cm long and an erect involucral bract that is 2-4 times as long as the inflorescence. In addition, the mature capsule is pointed on top rather than rounded and notched.

Parry's rush is locally common on drier slopes in the upper subalpine zone to above timberline. B.C. to CA, east to Alta. and CO.

8. *Juncus filiformis* L.

Thread Rush

Thread rush is a rhizomatous species that forms loose clumps with slender stems 5-30 cm (2-12 in) tall. The leaf blades are reduced to small scales or bristles. The branched and loosely aggregated inflorescence is subtended by an erect, needlelike bract that is at least 1/2 as long as the stem and much longer than the inflorescence. The flowers thus appear to be borne in the middle of the stem. The greenish tepals are 3-4 mm long and lance-shaped. The mature capsules are rounded at the top, and the seed is elliptical in outline.

This species is uncommon but locally abundant in wet, organic soil in the montane and lower subalpine zones. It can be found in wet meadows around some of the lakes on the Selway Divide in the Bitterroot Mountains. AK to OR, east to MT, WY, Newf., and PA; Eurasia.

9. *Juncus effusus* L.

Soft Rush

This rush has stems, 30-130 cm (1-4 ft) tall, densely clumped from stout rhizomes. The branched and loosely aggregated inflorescence is subtended by a needlelike bract, longer than the inflorescence but usually shorter than 1/2 the length of the stem. The narrowly lance-shaped tepals are 2-4 mm long and



d. *Juncus balticus* e. *J. drummondii* f. *J. parryi* g. *J. filiformis* h. *J. effusus*

have a pale midvein and papery margins. The mature capsule is 3-sided above, and the broadly rounded top is slightly notched. The seed is broadly elliptical with a small point at either end.

Our plants are var. compactus Lejeune & Court. Soft rush has been collected in the Bitterroot Valley in a pond near Lake Como southwest of Hamilton, and near the confluence of Bass Creek and the Bitterroot River. Widespread in temperate and boreal regions of North America and Eurasia.

This is the tallest true rush in our area. It looks much like J. balticus but is taller and coarser.

Group IV. These perennial species have flat, grasslike leaves, slightly flattened stems, and bracts of the inflorescence that are not erect or stemlike.

10. Juncus longistylis Torr.

Long-styled Rush

Long-styled rush has slender stems, 20-50 cm (8-20 in) tall, that arise singly or in loose clusters from strong rhizomes. The leaves are 1-3 mm wide and arise from near the base of the plant. The leaf sheaths have auricles that are 1-2 mm long and a straight or rounded tip. The flowers are aggregated into 1-8 small heads (3-12 flowers in each) that are borne in an open, short-branching inflorescence. The inflorescence is subtended by a small, brownish, papery bract 1-2 cm long. The brown tepals, 5-6 mm long, have a broad, greenish midvein and silvery-white margins. The mature capsule is rounded on top and slightly shorter than the tepals. The seeds are elliptical with a small point at either end.

Uncommon but widespread in moist, open habitats in the Bitterroot Valley and montane zone of the Sapphire Range. B.C. to CA, east to Ont., NE, CO, and NM.

11. Juncus regelii Buch.

Regel's Rush

These plants are up to 50 cm (20 in) tall with single or loosely clustered stems arising from rhizomes. The leaves are 3-4 mm wide and as long or longer than the stems. The leaf sheaths have narrow, straw-colored margins, and the auricles are small or lacking. The open, branched inflorescence is subtended by a narrow bract and consists of 1-4 globose flower heads. The dark brown tepals are 4-6 mm long and have a broad, greenish midvein and small awned tips. The mature capsule is rounded on top and about as long as the tepals. The seeds are cylindrical with long, membranous appendages at both ends.

Regel's rush is infrequent in moist or wet mountain meadows up to 2135 m (7,000 ft). One such site is in Chaffin Creek Canyon. B.C. to CA, east to MT and WY.

12. Juncus covillei Piper

Coville's Rush

Coville's rush has single or loosely tufted stems, 10-25 cm (4-10 in) tall, arising from strong rhizomes. The grasslike leaves may be as long as the stems. The sheaths have thin margins, and the auricles are absent or small and pointed. The inflorescence is subtended by a long, leaflike bract and consists of 1-5 loosely aggregated, several-flowered heads. The pale or dark brown tepals are 3-4 mm long and rounded or sharp-pointed. The mature capsule is notched on top and as long or longer than the tepals. The seed is egg-shaped.

Var. covillei has dark brown tepals and dark brown capsules that are about 1 mm longer than the tepals. It has been collected along the West Fork of the Bitterroot River south of Darby and along the main river near Connor. Var. obtusatus Hitchc. has pale brown tepals and a pale brown capsule that is about as long as the tepals. This variety has been found at 2470 m (8,100 ft) above Nelson Lake, southwest of Darby. B.C. to CA, east to ID and W. MT.

Group V. Species in this group are perennials and have tapering, cylindrical leaves with internal cross partitions (septae) that are often visible in good light.

13. Juncus mertensianus Bong.

Merten's Rush

Merten's rush has slightly flattened stems, 10-25 cm (4-10 in) tall, that are usually closely grouped on long rhizomes. The sheaths have acutely rounded, papery auricles 1-2 mm long. Numerous flowers are densely aggregated into a single, globose, dark brown or blackish head subtended by a narrow, slightly curved bract that is longer than the inflorescence. The dark brown tepals are 3-4 mm long and narrowly lance-shaped with pointed tips. The capsule is rounded and notched on top and slightly shorter than the tepals. The seeds are narrowly elliptical with small points on either end.

This species occurs at 1525-2865 m (5,000-9,400 ft), but is most common in wet meadows and around standing or flowing water in the subalpine zones. AK to CA, east to Alta. and NM; Asia.

14. Juncus nodosus L.

Tuberous Rush

Stems, 15-40 cm (6-16 in) tall, arise singly or in loose clusters from swollen nodes of slender rhizomes. There are 1-few stem leaves, the uppermost usually longer than the stem. The leaf sheaths have small, rounded auricles about 1 mm long. The flowers are aggregated in few to several, hemispheric heads that are loosely aggregated in a branched inflorescence. A leaflike bract subtends and surpasses the inflorescence. The greenish-brown or tawny tepals are 3-4 mm long and narrowly-lance-shaped with a long,



i. *Juncus longistylis* j. *J. regelii* k. *J. covillei*

pointed tip. The long, pointed capsule is longer than the tepals. The seed is elliptical with small, blunt points at either end.

Tuberous rush is locally common or abundant in open, wet or moist habitats in the valleys. B.C. to CA, east to Newf., ME, PA, NE, and NM.

15. Juncus nevadensis Wats.

Sierra Rush

Sierra rush is strongly rhizomatous with stems 15-60 cm (6-24 in) tall. The leaves are shorter than the stems, and the sheaths have rounded, membranous auricles 1-3 mm long. The open inflorescence is subtended by small involucre bract and consists of 2-5 flower heads, solitary at the ends of nearly erect branches. The dark brown tepals are about 3 mm long and lance-shaped with pointed tips. The capsules are rounded on top. The seeds are egg-shaped with small points at either end.

Our plants are var. badius (Suksd.) Hitchc. This species has been found along McClain Creek, southwest of Lolo. B.C. to CA, east to MT and NM.

16. Juncus alpinus Vill.

Northern Rush

Northern rush has short rhizomes and clustered stems, 15-40 cm (6-16 in) tall, that curve outward at the base and often form roots at the nodes. The 1-3 stem leaves are usually shorter than the inflorescence, and the sheaths have prominent, membranous auricles. The inflorescence is subtended but not surpassed by a leaflike bract and consists of few to several flowered heads borne at the ends of nearly erect branches. The pale to deep brown tepals are 2-3 mm long and rounded at the tip. The capsules are broadly rounded on top and longer than the tepals. The seeds are narrowly elliptical with small points on either end.

Occurs in wet, open habitats in the Bitterroot Valley and the montane zone of the Sapphire Range. It has not been found in the Bitterroot Mountains. AK to WA, east to Newf., PA, and CO; Eurasia.

17. Juncus articulatus L.

Jointed Rush

This species has stems, 15-50 cm (6-20 in) tall, that are clustered on short rhizomes and have outwardly curved bases that often form roots at the nodes. Each stem has 1-3 leaves that are shorter than the stems and have evident auricles. Numerous several-flowered heads are borne on the ends of mostly spreading branches in an open inflorescence that is subtended by a small, leaflike bract. The deep brown tepals are 2-3 mm long and lance-shaped with pale margins and pointed tips. The capsule is tapered to a distinct point at the tip. The seed is narrowly elliptical with a small point on either end.

Collected at several places in the Bitterroot Valley and once along the Clark Fork River west of Missoula. B.C. to CA, east to Newf., NY, CO, and NM.

Jointed rush is very similar to J. alpinus but can be distinguished by the spreading inflorescence and the pointed capsules.

18. Juncus torreyi Cov.

Torrey's Rush

The sturdy stems of Torrey's rush are 30-90 cm (12-36 in) tall and arise singly from swollen nodes of the rhizome. The sheaths of the 1-3 leaves project into rounded auricles, and the uppermost leaf is usually taller than the stem. Flowers are tightly aggregated in 1-several globose heads in a sparingly branched inflorescence subtended by a long, leaflike bract. The greenish or light brown tepals are 4-5 mm long, narrowly lance-shaped, and tapered to a long, pointed tip. The capsule is also tapered to a distinct point at the tip. The seed is egg-shaped with a small point on each end.

This species is uncommon in our area. It has been found in wet, slightly calcareous soil along ditches in the Bitterroot Valley north of Florence and south of Darby. B.C. to CA, east to Ont., ME, NY, and AL.

The large flower heads are distinctive.

Group VI. The single species in this group has a strongly flattened stem and leaves that are folded and flattened longitudinally like an iris.

19. Juncus ensifolius Wikst.

Dagger-leaf Rush, Rocky Mountain Rush

Dagger-leaf rush is a rhizomatous perennial with stems 20-60 cm (8-24 in) tall. The leaves have cross partitions and sheaths that sometimes have auricles. Flowers are closely aggregated in 2-several globose heads in an open, branched inflorescence. The leaflike involucre bract does not surpass the inflorescence. The pale green to deep purple tepals are 3-4 mm long, lance-shaped, and pointed at the tip. The capsule is rounded on top, and the seed is elliptical with a small point at each end.

The common var. ensifolius often lacks auricles and has 2-5 heads with dark brown or purplish flowers that have 3 stamens. It is common along small streams and around ponds and lakes from the valley into the subalpine zones. Var. montanus (Engelm.) Hitchc. usually has auricles and has 7-many flower heads with paler flowers that have 6 anthers. This variety was collected once at 2590 m (8,500 ft) on Mount Jerusalem in the southern Bitterroot Mountains. AK to CA, east to Alta. and NM.



l. *Juncus mertensianus* m. *J. nodosus* n. *J. nevadensis* o. *J. alpinus*



p. *Juncus articulatus* q. *J. torreyi* r. *J. ensifolius*

Luzula DC. Woodrush

The woodrushes are perennial, grasslike plants usually with sparse, long hairs on the leaf blades and sheaths. The flowers have 6 undifferentiated petals and sepals (tepals) and 6 stamens. The fruit is a 3-seeded capsule.

1. Inflorescence of 1-few cylindrical, many-flowered, spikelike heads.....2
1. 1-few flowers clustered at the ends of stalks in an open, branched inflorescence.....3
2. Inflorescence mostly stiffly erect, never drooping.....(1) L. campestris
2. Inflorescence drooping.....(2) L. spicata
3. Flowers borne in small, 3-several flowered clusters; plants <10 cm (4 in) tall.....(6) L. arcuata
3. Flowers borne singly or in twos at the ends of inflorescence branches; plants usually >10 cm.....4
4. Bracts at the base of the flowers and flower stalks lobed and fringed with long, spreading hairs.....(5) L. piperi
4. Bracts at the base of the flowers and flower stalks lobed but not fringed with hairs.....5
5. Tepals ca. 2 mm long (usually <2.5 mm).....(3) L. parviflora
5. Tepals ca. 3 mm long (usually >2.5 mm).....(4) L. hitchcockii

1. Luzula campestris (L.) DC.

Sweeps' Brush

This species has fibrous roots and forms tufts with stems 10-45 cm (4-18 in) tall. The leaves are 2-6 mm wide and have long, spreading hairs at least toward the base of the blades. The erect inflorescence consists of 1-few cylindrical spikes of flowers borne on erect or slightly arching stalks, the lower often subtended by leafy bracts. The pale green to deep brown tepals are lance-shaped and about 2-3 mm long. The capsule is shorter than the tepals.

Our plants are var. multiflora (Ehrh.) Celak. Sweeps' brush is common in moist meadows in the valley and montane zones in the Bitterroot Mountains. On the east side of the Bitterroot Valley, it is more common in subalpine meadows at the crest of the Sapphire Range. Throughout much of North America except the southeast states.

2. Luzula spicata (L.) DC.

Spiked Woodrush

Spiked woodrush is fibrous rooted and tufted with slender stems 5-40 cm (2-16 in) tall. The leaves are 1-3 mm wide with long, spreading hairs at the base. Flowers are densely congested in a single, spikelike, cone-shaped inflorescence that is nodding and subtended by a leaflike bract. The dark brown tepals are 2-3 mm long, narrowly lance-shaped, and tapered to a long point. The capsule is shorter than the tepals.

This plant occurs in dry, exposed habitats throughout the mountains. It is most conspicuous in open, gravelly soil of exposed, alpine ridges where it is often the only graminoid. AK to CA, east to Alta., WY, and CO; Eurasia.

The nodding, solitary, spikelike inflorescence is distinctive.

3. Luzula parviflora (Ehrh.) Desv.

Small-flowered Woodrush

Small-flowered woodrush forms dense or loose tufts with stems, 15-40 cm (6-16 in) tall, that spread outward and often root at the base. The leaves are 3-10 mm wide and mostly glabrous. The 1-few flowers are borne at the ends of stalks in an open, diffusely branched, often nodding inflorescence. The greenish to light brown (low elevations) or dark purplish-brown (high elevations) tepals are about 1-2 mm long and lance-shaped. There are 2 small, papery bracts, toothed at the tip, at the base of each flower and each flower stalk. The capsule is as long or longer than the tepals.

Common in moist or vernal moist, open or shaded habitats on cool slopes in the mountains to above timberline. AK to CA, east to Newf., NY, MN, and NM; Eurasia.

4. Luzula hitchcockii Hamet-Ahti

Smooth Woodrush

[L. glabrata (Hoppe) Desv.]

This strongly rhizomatous woodrush has solitary or loosely tufted stems 15-50 cm (6-20 in) tall. The leaves are 4-10 mm wide with long, spreading hairs at the base. The diffusely branched and spreading inflorescence consists of mostly solitary flowers on long stalks, each subtended by a papery, brown bract. The dark or purplish-brown tepals are about 3 mm long and broadly lance-shaped with pointed tips. At the base of each flower there are 2 small, brown bracts that have ragged upper margins. The capsule is as long or longer than the tepals.

Smooth woodrush is common in open, subalpine, and timberline forests in the Bitterroot Mountains where it is often associated with Chionophila tweedyi and Antennaria lanata. It is considered an indicator of cold environments where snow lies late. B.C. to OR, east to Alta. and WY.

The foliage becomes orange-colored in the fall.

5. Luzula piperi (Cov.) Jones
[L. wahlenbergii Rupr.]

Piper's Woodrush

Piper's woodrush forms dense tufts from short rhizomes and has stems 15-40 cm (6-16 in) tall. The leaves are 3-8 mm broad with long, spreading hairs at the base. Solitary flowers are borne on stalks in an open, branched inflorescence that is often nodding to one side. Each flower and flower stalk is subtended by small, lobed and fringed bracts. The purplish-brown tepals are about 2 mm long and broadly lance-shaped with a fine point or fringe. The capsule is usually slightly longer than the tepals.

Widespread but uncommon near timberline, often in moist microsites such as the north or east sides of boulders. AK to Que., south to WA and MT.

Piper's woodrush is very similar to L. parviflora but can be distinguished by the fringed rather than merely toothed flower and inflorescence bracts. Forms intermediate between these 2 species, possibly representing hybrids, are sometimes found.

6. Luzula arcuata (Wahl.) Wahl.

Curved Woodrush

This dwarf species forms small tufts from short rhizomes and has stems usually less than 10 cm (4 in) tall. The basal leaves are often tinged with purple. The open inflorescence consists of a few small clusters of flowers borne at the ends of slender, nodding stalks. The small bracts subtending the flowers and stalks are sparsely fringed at the tip. The light or dark brown tepals are about 2 mm long and lance-shaped. The capsule is about as long as the tepals.

A rare woodrush, it is usually associated with moss on cool, moist rock shelves in scattered locations, such as Lolo Peak and White Mtn. in the Bitterroot Mountains. Circumpolar, south in North America to WA and MT.

The plants are sometimes lying prostrate on the ground, weighted down by the mature capsules.

JUNCAGINACEAE Arrow-grass Family

Triglochin L. Arrow-grassTriglochin palustre L.

Marsh Arrow-grass

This perennial herb has erect, leafless stems, 15-30 cm (6-12 in) tall, from a short rhizome. The narrow basal leaves have sheathing membranous wings at the base and are nearly round in cross section with pointed tips. Greenish, bisexual flowers are borne in a narrow, terminal spike. The 3 sepals and 3 petals (tepals) are similar and 1-2 mm long. There are 6 stamens and a short, 3-lobed stigma. The club-shaped capsule, 6-7 mm long, is 3-angled, tapered at the base, and flattened at the top.

Marsh arrow-grass is generally found in wet or boggy, alkaline habitats. In our area it is known only from a pond above Dam Creek in the lower subalpine zone of the Sapphire Range east of Hamilton. Circumboreal, south to CA, NM, IL, and NY; South America.

LEMNACEAE Duckweed Family

These small, aquatic, perennial plants lack well-defined leaves and stems, but consist of fleshy, often leaflike bodies (thalli) that usually float on or near the water's surface and often form large colonies. Male flowers consisting of 1-2 stamens and female flowers of a single style and ovary are borne together in a small pouch, but they are rarely seen as these plants reproduce mostly by vegetative division.

- | | | |
|----|---|-------------------|
| 1. | Individual thalli up to 1 mm long, without roots..... | <u>Wolffia</u> |
| 1. | Individual thalli >2 mm long; at least some with roots..... | 2 |
| 2. | Plants with 1 root per thallus..... | <u>Lemna</u> |
| 2. | Plants with >1 root per thallus..... | <u>Spirodella</u> |

Lemna L. Duckweed

These small plants have flattened thalli with a single root. They float on the surface or submerged in the water.

- | | | |
|----|---|------------------------|
| 1. | Thalli 2-4 mm long, broadly elliptic to nearly round, separate or few together..... | (1) <u>L. minor</u> |
| 1. | Thalli 6-12 mm long, oar-shaped, often several attached together..... | (2) <u>L. trisulca</u> |



a. *Luzula campestris* b. *L. spicata* c. *L. parviflora* d. *L. hitchcockii* e. *L. piperi* f. *L. arcuata*

1. Lemna minor L.

Common or Small Duckweed, Water Lentil

The thallus of common duckweed floats on the surface and is egg-shaped to nearly round and 2-4 mm long. It is green or sometimes purplish.

Common in quiet water in the valleys. Cosmopolitan.

2. Lemna trisulca L.

Star Duckweed

This species has narrowly elliptical thalli, 6-12 mm long, with stemlike bases. New thalli form perpendicular to this base. Numerous light green thalli often form connected chains.

Star duckweed is uncommon in standing water in southern Ravalli County. Cosmopolitan.

Spirodela Schleid. Great DuckweedSpirodela polyrhiza (L.) Schleid.

Great Duckweed

Great duckweed has egg-shaped to round thalli, 3-10 mm long, that are solitary or in colonies. They are dark green above, convex and purplish below with a bundle of small roots.

Uncommon in quiet water in the northeast part of our area. Cosmopolitan.

Wolffia Horkel Water MealWolffia punctata Griseb.

Spotted Water Meal

Spotted water meal has an oblong thallus, about 1 mm long, without nerves or roots. They float on the surface of the water and are nearly flat on top but convex below. The surface is covered with numerous microscopic white or brown spots.

Known only from the northeast part of our area. Common in much of e. U.S. less common from WA to CA, east to MT; West Indies.

LILIACEAE Lily Family

These are perennial herbs with alternate or basal, undivided leaves and rootstocks, bulbs, or corms. The 1-many flowers are borne at the top of stems, in leaf axils, or in umbrellalike to spikelike inflorescences. The 3 sepals and 3 separate or united petals are different from each other or sometimes all 6 flower parts (tepals) are similar. There are 6(4) stamens and 1 or 3 styles. The ovary has 3 chambers, and the fruit is a capsule or a berry.

- | | | |
|----|--|---------------------|
| 1. | Plants with <5 flowers and/or fruits per stem..... | 2 |
| 1. | Plants with >5 flowers per stem..... | 9 |
| 2. | Flowers with well differentiated sepals and petals; the former green, the latter white to purple..... | 3 |
| 2. | Sepals and petals alike, at least in color..... | 4 |
| 3. | Plants with 3 elliptic leaves whorled at the top of the stem..... | <u>Trillium</u> |
| 3. | Leaves grasslike, alternate or basal..... | <u>Calochortus</u> |
| 4. | Leaves lance-shaped to elliptic, >3 cm (1 in) wide..... | 5 |
| 4. | Leaves linear, grasslike, mostly <2 cm wide..... | 7 |
| 5. | Plants with leafy stems; flowers <15 mm long, paired at the ends of the stem; fruit a reddish berry..... | <u>Disporum</u> |
| 5. | Leaves all basal; flowers >15 mm long; fruit a capsule or a blue berry..... | 6 |
| 6. | Flowers yellow, often with reflexed petals; fruit a capsule..... | <u>Erythronium</u> |
| 6. | Flowers white without reflexed petals; fruit a blue berry..... | <u>Clintonia</u> |
| 7. | Flowers orange to red, 4-6 cm (1-2 in) long; garden escapee..... | <u>Hemerocallis</u> |
| 7. | Flowers not reddish, <2 cm long..... | 8 |
| 8. | Flowers white; plants occurring subalpine or higher..... | <u>Lloydia</u> |
| 8. | Flowers yellow; plants of lower elevations..... | <u>Fritillaria</u> |
| 9. | Leaves grasslike, linear or nearly so, >10 times as long as broad..... | 10 |
| 9. | Leaves more-or-less elliptic in outline, <8 times as long as broad..... | 17 |

LILIACEAE

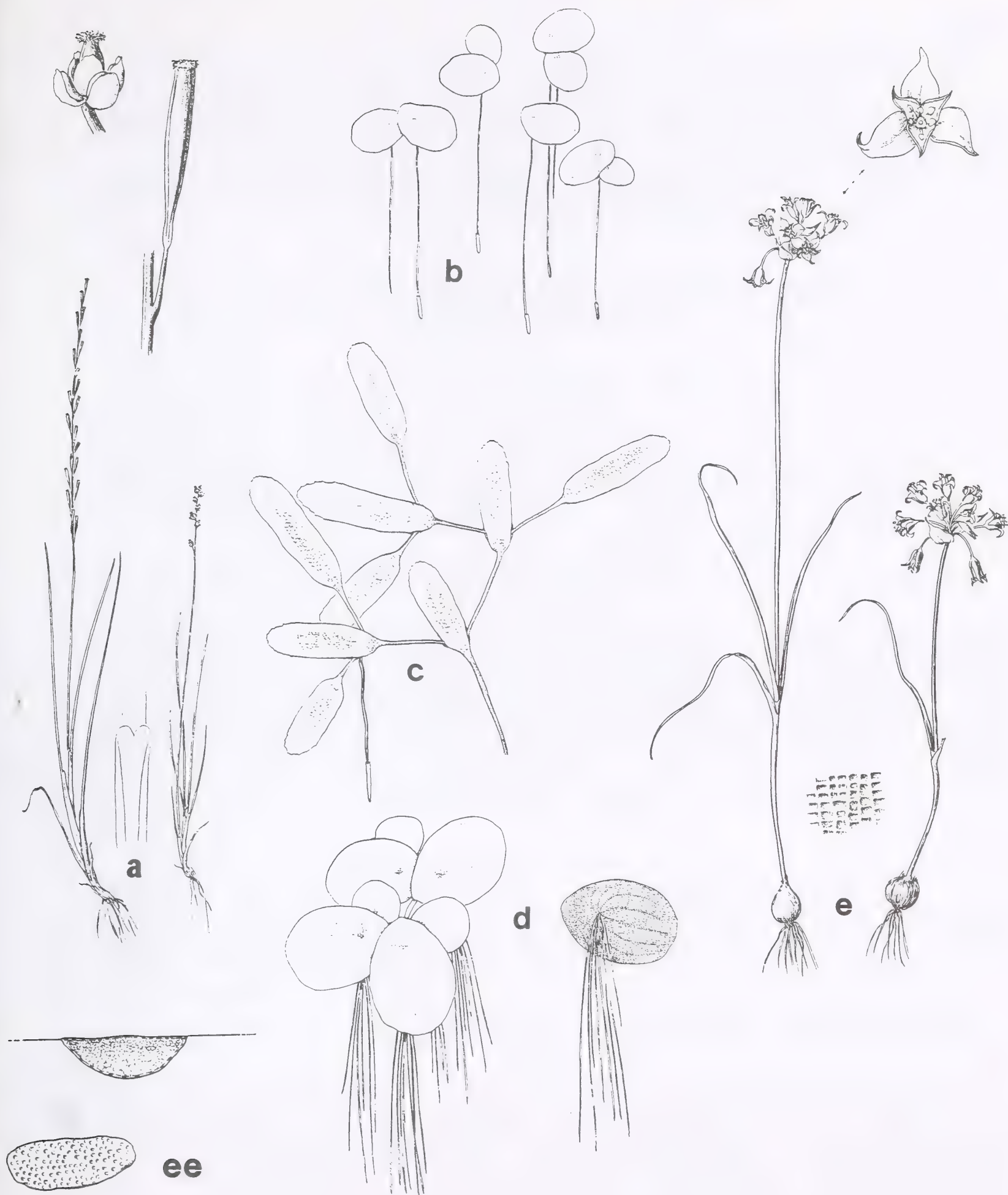
10. Plants with clusters of short, filiform branches at the ends of main branches, resembling the needles of a conifer, true leaves scalelike; fruit a berry; disturbed areas.....Asparagus
10. Plants with true leaves grasslike; fruit a capsule.....11
11. Flowers blue.....12
11. Flowers white, pink, green, or brownish.....13
12. Sepals and petals (tepals) widely spreading; flowers starlike in a spikelike inflorescence... Camassia
12. Tepals united; flowers narrowly bell-shaped in an umbrellalike inflorescence.....Brodiaea
13. Plants with large clumps of basal leaves (>20 leaves); leaves pointed and minutely saw-edged.....Xerophyllum
13. Plants with < 20 basal leaves; leaves not saw-edged.....14
14. Flowers greenish yellow to purplish green, nodding in an open, elongate inflorescence.....Stenanthium
14. Flowers white to pink; inflorescence not as above.....15
15. Inflorescence narrow and elongated.....Zigadenus
15. Inflorescence headlike or umbrellalike.....16
16. Upper stem covered with short, sticky hairs; plants rhizomatous.....Tofieldia
16. Upper stem without sticky hairs; plants with bulbs and an onionlike odor.....Allium
17. Plants with clusters of short, filiform branches at the ends of main branches, resembling the needles of a conifer, true leaves scalelike; fruit a berry; disturbed areas.....Asparagus
17. True leaves large and elliptic; needlelike branches absent.....18
18. Flowers borne on bent stalks hanging from the axils of the upper leaves.....Streptopus
18. Flowers borne in a terminal inflorescence.....19
19. Flowers green, borne on drooping side branches of the inflorescence; plants usually >80 cm (32 in).....Veratrum
19. Flowers white, borne on erect or spreading branches or in unbranched inflorescences; plants <80 cm tall.....Smilacina

Allium L. Onion, Chives

Members of this genus are perennial herbs with an onionlike odor and slender, flat or cylindrical leaves borne near the base of the plant. The mostly naked stems arise from thickened rhizomes or bulbs with membranous coatings. Stalked flowers are borne at the top of the stem in a globose to umbrellalike inflorescence subtended by 1-3 membranous bracts. Petals and sepals (tepals) are similar and occur in 2 whorls of 3 parts each. Anthers are short, and the egg-shaped to nearly round capsule has 1-3 seeds per chamber.

Several species are distinguished by the membranous bulb coat. Some plants may have the flowers partly or completely replaced by small bulbs.

1. Inflorescence with numerous, small, sessile bulbs among the long-stalked flowers.....(3) A. geyeri
1. Inflorescence without small, sessile bulbs.....2
2. Leaves round in cross section, hollow; inflorescence a globose head.....(5) A. schoenoprasum
2. Leaves mostly flat or concave in cross section, sometimes round but then not hollow; inflorescence hemispheric to umbrellalike.....3
3. Flower stem distinctly curved down at the top, inflorescence nodding.....(1) A. cernuum
3. Flower stem not bent down at the top.....4
4. Leaves flat.....5
4. Leaves concave (like a quarter moon) in cross section.....6
5. Leaves 2, sickle-shaped; stems <8 cm (3 in) tall; flowers light pink.....(8) A. parvum
5. Leaves >2, not curved; stems >10 cm (4 in) tall; flowers bright pink.....(4) A. brevistylum
6. Above-ground stems <5 cm (2 in) tall.....(6) A. simillimum
6. Stems >5 cm tall.....7
7. Bracts subtending the inflorescence with mostly 1 nerve; tepals ca. equal in length.....(1) A. textile
7. Inflorescence bracts with 3-7 nerves; inner tepals distinctly shorter than inner.....(7) A. acuminatum



a. *Triglochin palustre* b. *Lemna minor* c. *L. trisulca* d. *Spirodela polyrhiza* e. *Allium acuminatum*
 ee. *Wolffia punctata*

LILIACEAE

1. Allium cernuum Roth.

Nodding Onion

Nodding onion has stems, 10-40 cm (4-16 in) tall, from slender, often clustered bulbs with furrowed outer coats. The several leaves are about 2-4 mm wide and shorter than the stem. Flowers are borne in an umbrellalike inflorescence that is nodding or bent to one side on the end of the stem. The purplish-pink tepals are elliptical to egg-shaped and 4-6 mm long. Stamens are longer than the petals, and the capsule has 6 horns around the top.

This is our most common and widespread onion. It occurs in meadows and open forests that are moist in the spring, most commonly in the foothills but sometimes on warm slopes as high as the upper subalpine zone. AK across Can., south to OR, Mex., and GA.

2. Allium textile Nels. & Macbr.

Textile Onion

Textile onion has stems, 5-20 cm (2-8 in) tall, from egg-shaped, often clustered bulbs with fibrous, meshlike coats. The mostly 2 leaves are 1-5 mm wide and evidently concave in cross-section. Flowers are borne in a hemispheric, umbrellalike inflorescence subtended by pointed, egg-shaped bracts. Tepals are 5-7 mm long and white or pinkish with red midveins. Stamens are shorter than the tepals, and the capsule has 6 broad lobes on the summit.

Great Plains species, it is locally common in grasslands and shrublands in the foothills of the Sapphire Range. Alta. to Man., south to UT, ID, NM, and MN.

3. Allium geyeri Wats.

Geyer's Onion

Flowering stems are 10-35 cm (4-14 in) tall, and the egg-shaped, often clustered bulbs have several fibrous, coarse-meshed outer coats. The 3-4 leaves are 1-5 mm wide, mostly slightly shorter than the stems, and concave in cross section. The hemispheric inflorescence is subtended by 1-nerved, broadly lance-shaped bracts and consists of numerous small, sessile, purplish bulbs surpassed by several stalked flowers. The pink or white tepals are 6-8 mm long. The stamens are shorter than the tepals, and the ovary has 6 inconspicuous lobes on top.

Geyer's onion is infrequent to locally common in moist meadows and along streams in the montane and lower subalpine zones. Our plants are var. tenerum M.E. Jones. Eastern WA and OR, east to Alta., SD, and TX.

4. Allium brevistylum Wats.

Short-styled Onion

Short-styled onion has flattened stems 20-40 cm (8-16 in) tall and elongated bulbs mounted on a short rhizome. Inner bulb coats are whitish, while the outer are gray to brown and membranous with elongated cells. The 2-several flat leaves are 2-8 mm wide and considerably shorter than the stems. The erect, umbrellalike inflorescence is subtended by 2 broadly lance-shaped, 3- to 5-nerved bracts that are united at the base and borne to one side of the stem. The bright pink tepals, 10-13 mm long, are lance-shaped with a thickened midrib. Stamens are shorter than the tepals, and the capsule is broadly and indistinctly 3-lobed on top.

Scattered occurrences in montane to subalpine wet meadows throughout our area. MT and ID, south to UT and CO.

5. Allium schoenoprasum L.

Chives

Chives has stems, tapered toward the top and 15-40 cm (6-16 in) tall, arising from slender bulbs mounted on a short rhizome. Outer bulb coats are membranous, finely striped and gray to brown. The mostly 2 leaves sheath the stem and are hollow and 1-7 mm wide. The nearly globose inflorescence is subtended by 2 elliptical and pointed, 5- to 11-nerved bracts. The dark pink to deep purplish flowers have lance-shaped tepals, 8-12 mm long, with recurved tips. Stamens are smaller than the petals, and the capsule is rounded on top.

Uncommon on mud flats and gravel bars along our main rivers and in moist, subalpine meadows of the Sapphire Range. Circumboreal, south in North America to OR, CO, MN, and NY.

High elevation plants are deep lilac, while those from the valleys are much paler, resembling our garden chives.

6. Allium simillimum Henderson

Dwarf Onion

Dwarf onion has small egg-shaped bulbs with finely meshed outer coats and slightly flattened stems up to 5 cm (2 in) tall that are mostly below the surface of the ground. The 2 leaves are about twice as long as the stem, 1-2 mm wide, and concave in cross section. The leaves wither as the fruit matures. The hemispheric inflorescence, about 1 cm wide, is subtended by 2-3, 5- to 9-nerved, egg-shaped bracts. The narrowly lance-shaped tepals, 5-9 mm long, are white or pinkish with a green midrib and minutely toothed along the margins. Anthers are yellow or purplish, and the capsule has 6 small lobes at the top.

Our smallest onion is infrequent in sandy or gravelly, granitic soil of sparsely vegetated slopes or flats in the montane and subalpine zones at 1830-2285 m (6,000-7,500 ft) near the Idaho Border in the southern Bitterroot Mountains. Central and sw. ID and adjacent MT.

Dwarf onion flowers in June and has completely withered by mid-August. Colonies are generally small but dense.

7. Allium acuminatum Hook.

Tapertip Onion

This onion has tapered stems, 10-30 cm (4-12 in) tall, and mostly clustered, globose bulbs with thick, brown finely meshed, outer coats. The 2-3 sheathing leaves, 1-3 mm wide, are shorter than the stem and concave in cross section. They are frequently withered by flowering time. The umbrellalike inflorescence is subtended by 2, 3- to 7-nerved, lance-shaped bracts. Tepals are rose-purple to white. The outer ones, 10-12 mm long, are broadly lance-shaped with spreading tips, while the inner are smaller with minute teeth on the margins. The stamens are shorter than the tepals, and the capsule has 3 low crests on top.

Tapertip onion is rare in dry to moist, open habitats in the montane and lower subalpine zones in the southern part of our area. It has been collected above Star Creek Falls at 1950 m (6,400 ft), east of Sula and near Gibbon's Pass. B.C. to CA, east to W. MT, CO, and AZ.

8. Allium parvum Kell

Dwarf Onion

Dwarf onion has flattened stems, 3-5 cm (1-2 in) tall, and egg-shaped bulbs with outer coats that do not appear meshlike. The 2 thick, flat leaves, 2-5 mm wide, are longer than the stem and curved into a sickle shape. They are withered by flowering time. The hemispheric inflorescence is subtended by 2 purple, broadly lance-shaped, 5- to 9-nerved bracts. The pink, lance-shaped tepals have rounded tips and are 7-10 mm long. The yellow to purplish anthers are smaller than the tepals, and the capsule has 3(6) rounded crests on top.

Rare in gravelly soil of grassy or brushy slopes of the montane zone south of Darby and near Painted Rocks Reservoir. Eastern OR to SW. MT, south to NV and CA.

Asparagus L. Asparagus

Asparagus officinalis L.

Asparagus

Asparagus is a perennial with single or clustered, profusely branched stems up to 1.5 m (5 ft) tall from branched rootstocks. The alternate, membranous, scalelike leaves each subtend several, short, filiform branches that resemble needles of a conifer. Unisexual, drooping flowers are borne in the axils of the leaves. The 3 petals and 3 sepals are similar, 3-7 mm long, and greenish-white. Male flowers have 6 stamens about as long as the tepals. The fruit is a few-seeded, red berry.

Asparagus is well established along rivers, highways, and railroad embankments. Introduced from the Old World to much of North America.

Brodiaea Sm. Brodiaea, Cluster Lily

Brodiaea douglasii Wats.

Wild Hyacinth

Wild hyacinth is a perennial with naked flower stems up to 70 cm (28 in) tall from a deep, egg-shaped, bulblike corm with a fibrous outer coat. The 1 or 2 flat, linear leaves are shorter than the stem. The 5-15 light blue, bisexual flowers are borne in an open, umbrellalike inflorescence subtended by lance-shaped bracts. The similar petals and sepals (tepals) are united below to form a narrowly bell-shaped flower with wavy-margined inner tepals. The 6 stamens are shorter than the tepals, and the style is 3-lobed at the tip. The fruit is a nearly round capsule about 8 mm long.

Common in grasslands and open forests in the valleys and foothills. It is often associated with balsamroot and lupine. B.C. to OR, east to MT, WY, and UT.

Calochortus Pursh Mariposa, Sego Lily

These are glabrous perennials from deep-seated bulbs similar to those of onion. The few leaves are alternate or all basal. Solitary or few, bisexual flowers are borne at the ends of the stems. The 3 narrow sepals are green, while the 3 broad, colorful petals are hairy on the inner surface with a round or crescent-shaped gland toward the base. The 6 stamens are shorter than the petals, and the round to elliptical fruit is 3-angled in cross section and contains numerous seeds. The size of the flowers is quite variable.

1. Petals with scattered long hairs on the inner face but not on the margins; fruit held erect.....(3) C. eurycarpus
1. Petals with long hairs on the margins as well as the inner face.....2



f. *Allium brevistylum* g. *A. cernuum* h. *A. geyeri* i. *A. parvum* ii. *A. acuminatum*



j. *Allium schoenoprasum* k. *A. simillimum* l. *A. textile* m. *Asparagus officinalis* n. *Brodiaea douglasii*

LILIACEAE

2. Gland near the base of the petal round or broadly elliptic.....(1) C. apiculatus
2. Gland crescent-shaped (like a 1/4 moon).....(2) C. elegans

1. Calochortus apiculatus Baker

Pointed Mariposa, Cat's Ear

Pointed mariposa has stems up to 30 cm (12 in) tall and a single basal leaf, 5-15 mm broad, tapering to both ends and shorter than the stem. The 1-5 cream-colored, stalked flowers are subtended by 2-3 lance-shaped, leaflike bracts. Nearly rhombic, erect or spreading petals are beset with long hairs and nipplelike projections surrounding the dark, elliptical gland. The lance-shaped sepals are shorter than the petals. The nearly circular, 3-winged fruits are borne on nodding stalks.

Common in dry meadows, grasslands, and open forests in the foothills to the lower subalpine zone in the Rattlesnake Mountains and Sapphire Range. B.C. and Alta., south to WA, ID, and w. MT.

2. Calochortus elegans Pursh

Elegant Mariposa

This mariposa has a stem, 5-15 cm (2-6 in) tall, surpassed by the single basal leaf, 2-10 mm wide, that is tapered at both ends. The 1-few white or greenish flowers are subtended by mostly 2 narrow, leaflike bracts. The broadly lance-shaped petals are long-hairy and have minute, nipplelike projections and a purple crescent above the gland on the inner face. The elliptical to orbicular fruit is 3-winged and nodding.

Our plants are var. selwayensis (St. John) Owenby. Elegant mariposa is common in dry meadows and open forests throughout the Bitterroot Mountains, from the foothills to as high as 2375 m (7,800 ft) on Bare Cone Peak, south of Darby. Eastern WA, sw. MT, and adjacent ID, south to OR and n. CA.

Hybrids between C. elegans and C. apiculatus having characteristics of both species were found northeast of Missoula by Peter Stickney. This is the only known location where these species meet.

3. Calochortus eurycarpus Wats.

Bigpod Mariposa

Bigpod mariposa has stems, 15-40 cm (6-16 in) tall, and a single basal leaf, 10-25 mm wide, that tapers to both ends and is shorter than the stems. Each stem has a single small leaf about half-way up and 2 or more narrowly lance-shaped, leaflike bracts at the base of the inflorescence. The showy, creamy white (or light lavender) flowers have a large, red-purple spot in the middle of each petal with a yellowish, crescent-shaped gland just below. Each petal is fan-shaped with scattered long hairs near the gland. The elliptical capsule is erect and 3-winged.

Collected only once in our area, above Star Creek Falls, east of Sula in the Anaconda-Pintler Wilderness. Found in southwest MT, western WY, central ID, southeast WA, and eastern OR.

Camassia Lindl. Camas

Camassia quamash (Pursh) Greene

Camas

Flowering stems of this perennial are 20-50 cm (8-20 in) tall from an egg-shaped bulb with a brownish coat. The narrow leaves arise from near the base. Stalked, bisexual flowers, each subtended by a narrow bract, are borne in a spikelike inflorescence up to 20 cm (8 in) long. The light to deep purplish-blue petals and sepals (tepals) are 15-35 mm long and widely spreading to form a star-shaped flower. The 6 stamens often have yellow anthers. The fruit is an egg-shaped capsule 15-18 mm long.

Camas is common in meadows that are wet during spring but dry by late summer from the valleys to the lower subalpine zone. B.C. to CA, east to Alta., WY, and UT.

This plant blooms from May to July depending on elevation and snow cover. The bulbs were an important food for the Salish and Nez-Perce Indians.

Clintonia Raf. Queencup

Clintonia uniflora (Schult.) Kunth

Queencup, Beadlily, Bride's Bonnet

Queencup has slender, soft-hairy, leafless stems, 6-15 cm (2-6 in) tall, from slender, spreading rootstocks. The 2 or rarely 3 elliptical leaves have short petioles and the blades are 8-18 cm (3-7 in) long, soft-hairy beneath and deep green above and are usually pressed flat to the ground. The usually solitary, bisexual flower is borne at the top of the stem, subtended by a small bract. Petals and sepals (tepals) are white, separate, and about 2 cm long. The 6 stamens are shorter than the petals, and the fruit is a smooth, dark blue berry.

Common in moist forests of the montane and lower subalpine zones throughout the Bitterroot Mountains and northern Sapphire Range. It is usually associated with grand fir, Pacific yew, western red cedar, Linnaea borealis, Cornus canadensis and species of Pyrola. AK to CA, east to Alta. and MT.



o. *Calochortus apiculatus* p. *C. elegans* q. *C. eurycarpus* r. *Camassia quamash*

Disporum Salisb. Fairy Bells

Rhizomatous perennials with branched, leafy stems. The sessile, prominently veined leaves are slightly rotated from the horizontal where they meet the stem. Pairs of stalked, bisexual, tubular to bell-shaped flowers hang from the tips of the branches. Petals and sepals (tepals) are similar and separate. There are 6 stamens, and the fruit is a red, few-seeded berry.

1. Leaves glabrous on the upper surface; style 3-lobed at the tip; berry covered with minute bumps.....(1) D. trachycarpum
1. Leaves hairy on the upper surface; style not distinctly lobed at the tip; berry smooth and covered with short hairs.....(2) D. hookeri

1. Disporum trachycarpum (Wats.) Benth. & Hook.

Wartberry, Fairy Bells

This species has crisp-hairy stems, 30-60 cm (1-2 ft) tall, and egg-shaped to broadly lance-shaped leaves 4-10 cm (2-4 in) long. They are rounded at the base with spreading hairs along the margins. The creamy white tepals are 8-15 mm long, shorter than the stamens, and the style is 3-parted at the tip. The nearly round berry, 7-10 mm long, is densely covered with minute bumps.

Wartberry is locally common in moist to somewhat dry forests from the valleys to the lower subalpine zone throughout our area. B.C. to OR, east to Alta., CO, and AZ.

2. Disporum hookeri (Torr.) Nicholson

Hooker's Fairy Bells

Hooker's fairy bells is similar to D. trachycarpum, but the leaves are hairy on the upper surface, and the marginal hairs point forward rather than spreading outward. The style is only obscurely lobed at the tip, and the orange-red, egg-shaped berries have a smooth surface covered with short, soft hairs.

Uncommon, found only in the shade of moist forests in the valleys to the lower subalpine zone. B.C. to OR, east to Alta. and W. MT.

Erythronium L. Dogtooth VioletErythronium grandiflorum Pursh

Glacier Lily

A glabrous, perennial herb with leafless, unbranched stems, 10-25 cm (4-10 in) tall, from an elongated, bulblike root. The mostly 2, dark green leaves, 6-16 cm (2-6 in) long, have short, broad petioles and lance-shaped blades. The 1-3 stalked, bisexual flowers nod at the ends of the stems. The light to deep yellow, narrowly lance-shaped petals and sepals (tepals), 25-45 mm (1-2 in) long, at first spread to form a bell-shaped flower but later become reflexed, completely exposing the 6 stamens with white to reddish anthers. The style is 3-lobed at the tip, and the 3-celled capsule, 3-6 cm (1-2 in) long, is shaped like a light bulb.

Glacier lilies are common in open forests and forest openings from the valleys to timberline. B.C. to OR, east to Alta., WY, and CO.

This plant is more widespread in the Bitterroot Mountains than the other ranges of our area. In the Bitterroots it occurs at higher elevations and is characteristic of sites with late-melting snow along with Claytonia lanceolata. On drier, shallower soils it occurs with Luzula hitchcockii, Antennaria lanata, Cassiope and Phyllodoce, while on deeper soils with more moisture-holding capacity, it grows with Trollius, Veratrum and Dodecatheon jeffreyi. Near Missoula, glacier lilies begin flowering in late April and can still be found in bloom on the Bitterroot-Selway Divide in late August.

Fritillaria L. Fritillary

Fritillaries are glabrous, perennial herbs with unbranched stems from bulblike roots bearing numerous white bulblets around the bottom. Flowers are usually nodding with petals and sepals (tepals) that are similar and separate. The 6 stamens are shorter than the tepals, and the 6-lobed or 6-angled fruit contains many seeds.

1. Flowers yellow, fading to red; style not lobed at the tip.....(1) F. pudica
1. Flowers brown or purple, mottled with yellow; style 3-lobed at the tip.....(2) F. atropurpurea

1. Fritillaria pudica (Pursh) Spreng.

Yellow Bell

The stems are 8-25 cm (3-10 in) tall with 2 opposite or several alternate, nearly linear leaves, 3-12 cm (1-5 in) long. The solitary (2-3) yellow flowers are bell-shaped. The lance-shaped tepals, 12-25 mm long, are purplish or brownish but fade to red towards the base. Egg-shaped capsules, about 2 cm long, are shallowly 6-lobed.

One of our best known spring flowers, yellow bell is common in the grasslands of the valleys and foothills where it blooms with Mertensia, Dodecatheon, and Lithophragma in April and May. B.C. to CA, east to Alta., WY, and UT.

2. Fritillaria atropurpurea Nutt.

Chocolate Lily, Leopard Lily

Chocolate lily has slender stems, 15-30 cm (6-12 in) tall, and alternate, linear leaves, 4-12 cm (1-5 in) long, that become crowded toward the top of the stem. The broadly bell-shaped flowers have lance-shaped tepals, 12-20 mm long, that are greenish-purple to chocolate-brown and mottled with yellow. The 6-angled capsules are about 15 mm long.

Chocolate lily is uncommon in small colonies in meadows and open forests in the foothills of the Bitterroot Mountains at 1065-1645 m (3,500-5,400 ft). OR to CA, east to ND, NE, and NM.

Hemerocallis L. DaylilyHemerocallis fulva L.

Daylily

A glabrous perennial with leafless stems up to 80 cm (32 in) tall and fleshy, yellow roots. Linear basal leaves are up to 50 cm (20 in) long, about 2 cm wide, and V-shaped in cross section. Few to several trumpet-shaped flowers with short, thick stalks are borne in an open, leafy-bracted inflorescence. The dark orange sepals and petals (tepals) are lance-shaped and 4-6 cm long. The style is longer than the 6 stamens. The fruit is a many-seeded capsule about 5 cm long.

A garden escapee of Asian origin, daylily has been found in moist ditches along roads near Hamilton. Widespread in U.S. (Not illustrated).

Lloydia Salisb. Alp LilyLloydia serotina (L.) Sweet

Alp Lily

Alp lily is a glabrous perennial with an erect stem 5-12 cm (2-5 in) tall and a short, bulblike rhizome with a fibrous outer coat. There are 1-few grasslike basal leaves, 4-10 cm (2-4 in) long, and 2-4 shorter, stem leaves. The single (rarely 2), bisexual flower has oblong petals and sepals (tepals), about 1 cm long, that are white with purplish or greenish veins. The 6 stamens are shorter than the petals, and the egg-shaped capsule is 6-8 mm long.

An arctic-alpine species, it is infrequent but widespread on moist, cool slopes of most alpine peaks of the Bitterroot Mountains south of Lost Horse Creek. Near Ranger Peak, west of Stevensville, it is found below timberline. Circumpolar, south in North America to OR, NV, and NM.

Smilacina Desf. False Solomon's Seal, Solomon's Plume

Members of this genus are perennial herbs with extensive, horizontal rootstocks and unbranched stems that are scaly below and leafy above. Leaves are alternate and sessile or with short petioles. Several to numerous, small, white, bisexual flowers are borne in a branched or simple inflorescence. The petals and sepals are similar (tepals). There are 6 stamens, and the fruit is a globose berry with few seeds.

1. Inflorescence branched; petals <3 mm long, shorter than the stamens.....(1) S. racemosa
1. Inflorescence unbranched; petals >3 mm long, longer than the stamens.....(2) S. stellata

1. Smilacina racemosa (L.) Desf.

Western False Solomon's Seal

This species has stems, 30-80 cm (12-32 in) tall, that rise at an angle and nearly sessile, broadly lance-shaped leaves, 5-12 cm (2-5 in) long, with prominent, parallel veins. The inflorescence, 5-12 cm (2-5 in) long, has clusters of flowers on the side branches. Linear to narrowly spoon-shaped tepals are 2-3 mm long, shorter than the stamens. The reddish berry is 5-7 mm long.

Western false Solomon's seal is common in partial shade of montane and subalpine forests. Across n. North America, south to CA, NV, and AZ.

2. Smilacina stellata (L.) Desf.

Starry False Solomon's Seal

This plant has erect stems, 20-60 cm (8-24 in) tall, and sessile, lance-shaped leaves, 3-8 cm (2-3 in) long, that often clasp the stem and are folded along the midrib. Few to several stalked flowers are borne in the unbranched, zig-zag inflorescence 2-5 cm (1-2 in) long. The linear tepals, 3-5 mm long, are longer than the stamens. The berries are, at first, green with black stripes, later becoming black or reddish.

Common in thickets and open forests, especially cottonwood and aspen groves in the valleys but can be found as high as the lower subalpine zone. Across n. North America, south to CA, NV, and AZ.



s. *Clintonia uniflora* t. *Diporum hookeri* u. *D. trachycarpum* v. *Erythronium grandiflorum*
w. *Fritillaria atropurpurea* x. *F. pudica*

Stenanthium (Gray) Kunth StenanthiumStenanthium occidentale GrayWestern Stenanthium

Slender erect stems up to 35 cm (14 in) tall with only 1-2 narrow, leaflike bracts arise from an elongated bulb. The 2-few basal leaves are narrowly lance-shaped and 8-15 cm (3-6 in) long. Stalked and nodding, bisexual flowers are borne in a simple or sparingly branched, open inflorescence. The separate sepals and petals (tepals), 8-15 mm long and greenish yellow to purplish with spreading tips, form the narrowly bell-shaped flower. The 6 stamens are nearly as long as the tepals, and the lance-shaped capsule is up to 2 cm long.

Stenanthium is infrequent but widespread in small colonies on moist but well-drained, often partly shaded slopes in the montane zone to near timberline in the Bitterroot Mountains. B.C. to CA, east to Alta. and W. MT.

In the northern part of the range, this attractive lily is found at lower elevations than further south where it may be found up to 2745 m (9,000 ft).

Streptopus Michx. Twisted-stalkStreptopus amplexifolius (L.) DC.

Twisted-stalk

Twisted-stalk is a perennial herb with glabrous or hairy, leafy, branched stems, 40-100 cm (16-40 in) tall, from creeping rootstocks. The sessile, egg-shaped to broadly lance-shaped leaves, 5-15 cm (2-6 in) long, have pointed tips and bases that clasp the stem. The 1 or 2 pendant, bisexual flowers hang from the axils of the upper leaves on stalks that are bent in the middle. The separate sepals and petals (tepals) are green to yellow with spreading tips, and they form a narrowly bell-shaped flower. The 6 stamens are shorter than the tepals, and the fruit is an oval, bright orange-red berry 10-12 mm long.

Common along streams and in thickets in the montane and lower subalpine zones, often associated with species of Smilacina, Actaea and Osmorhiza. Our plants are var. chalastratus Fassett. Much of North America north of Mex. The var. amplexifolius occurs in central Europe.

Tofieldia Huds. TofieldiaTofieldia glutinosa (Michx.) Pers.Tofieldia

Tofieldia has short rootstocks and leafy, unbranched stems, 12-35 cm (5-14 in) tall, covered with sticky hairs. There are 2-3 linear leaves, 5-15 cm (2-6 in) long, at the base and 1-3 more that sheath the lower stem. Numerous small, bisexual flowers are borne in 3's in a tight, terminal cluster, 1-2 cm long, that elongates as the fruit matures. The white or greenish sepals and petals (tepals) are similar and nearly equal in length. The 6 stamens are nearly as long as the petals, and there are 3 short, spreading styles. The fruit is a 3-lobed capsule, 5-7 mm long.

Our plants are var. montana (Hitchc.) Davis. They are common in moist to wet meadows in the subalpine and timberline zones, often associated with Danthonia intermedia, Deschampsia cespitosa, Erigeron peregrinus and Gentiana calycosa. AK to Atlantic seaboard, south to CA, WY, and NC.

Trillium L. Trillium, WakerobinTrillium ovatum PurshTrillium, Wakerobin

A glabrous perennial with 1-few fleshy, unbranched stems, 10-25 cm (4-10 in) tall, from a short, thick rhizome. Each stem bears a whorl of 3 sessile, broadly egg-shaped leaves, 5-15 cm (2-6 in) long, toward the top of the stem. A single stalked, bisexual flower is borne above the leaves. The green sepals, 2-5 cm (1-2 in) long, are narrower and shorter than the snow-white, elliptical petals that eventually fade to pink or purple. There are 6 stamens and a 3-parted style. The fruit is a fleshy, 3-angled, many-seeded capsule that turns yellow when mature.

Trillium is common in moist, rich soil of forests from the foothills to the lower subalpine zone. B.C. to CA, east to Alta., WY, and CO.

This is perhaps the most elegant spring wildflower in our area. It blooms from spring to early summer depending on elevation.

Veratrum L. Corn Lily, False HelleboreVeratrum viride Ait.

Corn Lily, False Hellebore

Corn lily is a coarse, somewhat hairy perennial that has leafy, unbranched stems up to 2 m (5 ft) tall from a short thick rootstock. The sessile leaves clasp the stem and are broadly elliptical and strongly veined. The lower are up to 30 cm (12 in) long, becoming gradually smaller upward. Numerous flowers are



y. *Lloydia serotina* z. *Smilacina racemosa* a. *S. stellata* b. *Stenanthium occidentale*

borne on drooping, leafy-bracted side branches of the long (up to 60 cm), terminal inflorescence. Flowers in the upper portion of the inflorescence are bisexual, while the lower ones have only stamens. The elliptical sepals and petals (tepals) are similar, green or yellowish, and 6-10 mm long. The 6 stamens are about half as long as the tepals, and the fruit is a narrowly elliptical capsule, 2-3 cm long.

Common in deep, moist soils of meadows and forest openings from the foothills through the montane zone and occasionally into the lower subalpine. AK to OR, east to Que. and NC.; south in the Rocky Mountains to MT and ID.

Corn lily is one of our tallest herbs and has the largest entire-margined leaves in the forest. They are often conspicuously shredded by hail, but are not eaten by wildlife and rarely by insects because the plant is so poisonous.

Xerophyllum Michx. Beargrass

Xerophyllum tenax (Pursh) Nutt.

Beargrass

Leafy unbranched stems of this stout perennial are up to 1.5 m (5 ft) tall, arising from large clumps of bluish-green, wiry, saw-edged, grasslike leaves 15-60 cm (6-24 in) long. The stem leaves are smaller, much shorter, and somewhat narrower. Numerous bisexual, stalked flowers are borne in a terminal inflorescence that is, at first, crowded and hemispheric or cylindrical but becomes greatly elongated as the fruits mature. The spreading, cream-colored sepals and petals (tepals) are oblong and 6-10 mm long. The 6 stamens are mostly longer than the tepals, and the 3-lobed, egg-shaped capsule is 5-7 mm long.

Beargrass is common on open slopes and in forests of the montane to subalpine zones. B.C. to CA, east to Alta. and MT.

Offshoots from the thick, shallow rhizome remain vegetative for many years. Each of these "plants" flowers only once and then dies. Once every few years the flower stalks appear in great masses, while in most years there are only a few. The sharp, wiry leaves are hardly ever eaten by animals, but the flower stalk is eagerly taken by deer, elk, bears, horses, and cattle. Chipmunks harvest the seeds as soon as they are ripe, and much of what is left is taken by pine grossbeaks.

Zigadenus Michx. Death Camas

These are glabrous perennials with coated bulbs and unbranched stems that have grasslike leaves at the base and scattered, small leaves above. Stalked flowers, subtended by narrow bracts, are borne in an unbranched, elongated inflorescence. They are wheel- or shallowly bell-shaped and formed by petallike tepals, the outer 3 shorter than the inner. Each white to yellowish green tepal is lance-shaped with a colored gland near the narrowed base. The 6 stamens are equal to or longer than the tepals, and there are 3 separate styles. The fruit is a 3-celled capsule with horns on the top.

1. Petals and sepals (tepals) 8-11 mm long with a distinct green gland at the base; mostly moist subalpine meadows and openings.....(2) Z. elegans
1. Tepals <7 mm long with an indistinct gland at the base; mostly dry grasslands.....(1) Z. venenosus

1. Zigadenus venenosus Wats.

Death Camas

The slender stems are 15-40 cm (6-16 in) tall from an egg-shaped, dark-coated bulb, and the keeled leaves are nearly as long as the stem and 3-8 mm wide. The inflorescence, 5-12 cm (2-5 in) long, is open below but dense above, and the cream-colored flowers are shallowly bell-shaped with an indistinct, greenish gland at the base of the tepals. Flowers are 4-5 mm long, and the capsules are 12-15 mm long.

Common death camas is widespread in grasslands and shrublands, mainly in the foothills but occasionally up to subalpine meadows. B.C. to Baja Cal., east to Sask., SD, and NE.

This plant is very poisonous and presents a real danger to cattle and especially sheep because of their smaller body weight.

2. Zigadenus elegans Pursh

Mountain or Elegant Death Camas

Slender stems, 15-60 cm (6-24 in) tall, arise from elongated bulbs clustered on a short rootstock, and the keeled leaves are 2-15 mm wide. Wheel-shaped, greenish-white flowers are borne in an open inflorescence. The tepals, 9-11 mm long, have many clear nerves and a distinct, heart-shaped gland at the base. The capsule is 18-24 mm long.

Mountain death camas occurs in subalpine meadows and forest openings. It is scattered in the Sapphire Range and infrequent in the Bitterroot Mountains, mainly south of Lost Horse Creek. AK to AZ, east to Alta., SD, TX, and Mex.

This species is less poisonous than the former plant and is generally not found in areas where livestock are grazed.



c. *Streptopus amplexifolius* d. *Tofieldia glutinosa* e. *Trillium ovatum* f. *Veratrum viride*
g. *Xerophyllum tenax*

ORCHIDACEAE Orchid Family

Orchids are perennial herbs with fleshy roots. Leaves are undivided and entire-margined. Saprophytic species lack green leaves and obtain all their nutrients from decaying matter in the soil. 1-many flowers are borne in terminal, unbranched inflorescences. The bisexual flowers have 3 green or colored sepals and 3 petals. The lower petal (lip) is often differently shaped than the other ones and sometimes has a saclike spur at the base. The 3 stamens and single style are united to form a column bearing pollen clusters near the tip. Fruits are mostly elliptical, 3-chambered capsules with dustlike seeds.

1. Green leaves completely lacking.....Corallorhiza
1. Plants with green leaves.....2
2. Each plant with only a single leaf at the base.....Calypso
2. Plants with >1 leaf on the stem or at the base.....3
3. Plants with a single pair of opposite leaves in the middle of the stem.....Listera
3. Plants not as above.....4
4. Lower petal slipper- or pouchlike; flowers 1-3.....Cypripedium
4. Lower petal not forming a pouch; flowers >3.....5
5. Flowers with a an elongate lip petal forming a saclike to cylindrical spur at the base.....Habenaria
5. Flowers with a short lip, spur lacking.....6
6. Leaves all basal, evergreen and white-mottled along the midvein.....Goodyera
6. Stem leaves mostly present, basal leaves not evergreen and white-mottled.....Habenaria

Calypso Salisb. Fairy Slipper, Calypso

Calypso bulbosa (L.) Oakes

Fairy Slipper

Fairy slipper has sheathed stems, 5-12 cm (2-5 in) tall, from a bulblike root. The solitary basal leaf has a prominently nerved, elliptical blade, 25-45 mm (1-2 in) long, and a petiole as long as the blade. The leaf appears in the fall and persists through the winter to whither after the fruit matures in early summer. The single (rarely 2) flower is ascending to nodding. The 3 sepals and the 2 upper petals are lance-shaped, 15-22 mm long, and red-purple with dark veins. The large lower petal is slipper-shaped and whitish to red-purple with brownish streaks inside and 2 small horns on the "toe." The column has a hood that partially covers the opening of the lower petal. The red-purple capsule is about 1 cm long.

Plants are scattered to locally common in moist, organic soil of forests in the foothills and montane zone. It seems to be more common near western larch. Circumboreal, south to CA, AZ, MI, and NY.

Corallorhiza Chat. Coral Root

The members of this genus are saprophytic; they lack green leaves and obtain all their nutrients from soil organic matter. The branched roots are bumpy and resemble coral. The yellow to reddish-purple stems are covered with membranous, sheathing bracts. Short-stalked flowers are borne in a narrow inflorescence. The sepals are longer than the petals, and the upper petals and the upper sepal are curved over the top of the column. The lower petal (lip) is egg-shaped or elliptical and 3-lobed or undivided at the tip. The egg-shaped capsules are pendent.

1. Sepals and petals with 3-5 distinct red to purple stripes.....(3) C. maculata
1. Sepals and petals sometimes with reddish veins but without distinct stripes.....2
2. Lip mostly <5 mm long; lateral sepals with only 1 nerve.....(2) C. trifida
2. Lip mostly >5 mm long; lateral sepals usually with >1 nerve.....3
3. Lip petal pink or reddish.....(4) C. mertensiana
3. Lip white, often with red or purple spots.....(1) C. maculata

1. Corallorhiza maculata Raf.

Spotted Coral Root

Stems of this species are 15-35 cm (6-14 in) tall and purplish to reddish-brown or yellow in uncommon albino plants. There are 10-several flowers per stem. The lance-shaped sepals, 6-10 mm long, are reddish-purple with 3 nerves. The 2 upper petals are spotted or simply nerved. The pure white or purple spotted lip, 5-8 mm long, has 2 small lateral lobes near the base. The yellow column is spotted below.

Our most common species of coral root is found in moist to dry, humic soils in pine forests in the foothills and montane zone. B.C. to N.S., south to CA, NM, IN, and FL; Central America.

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2. Corallorhiza trifida Chat.

Yellow or Northern Coral Root

Yellow coral root has stems, 5-20 cm (2-8 in) tall, with 3-15 yellow to cream-colored flowers. The sepals and upper petals are lance-shaped and longer than the lip. The white or occasionally few-spotted lip has upturned margins and is shallowly lobed with 2 distinct bulges on the surface near the base. The column is nearly as wide as the upper petals, and the capsule is about 1 cm long.

Requires moister, shadier habitats than our other species. It occurs in aspen groves and among tall vegetation along streams in the montane and lower subalpine zones. Circumboreal, south to OR, CO, and NJ.

This plant is easily overlooked and may be more common than our records indicate.

3. Corallorhiza striata Lindl.

Striped Coral Root

Striped coral root has purplish stems, 15-35 cm (6-14 in) tall, and 5-many flowers. The pink sepals and upper petals are narrowly elliptical with brown or purplish nerves. The entire-margined, elliptical lip is about 12 mm long and concave with purple stripes. The column is dark purple and spotted near the base.

Infrequent in moist to dry forests in the foothills and montane zone. B.C. to Que., south to CA, Mex., and MI.

4. Corallorhiza mertensiana Bong.

Western Coral Root

This orchid has reddish-purple stems, 15-30 cm (6-12 in) tall. The narrow sepals and upper petals are purple, sometimes with a greenish tinge or with yellow veins. The pink or reddish lip, 7-9 mm long, has an incurved tip and a small lobe on either side near the base. There is a small pouchlike spur just below the base of the lip, and the slender column is curved down. The capsule is 15-25 mm long.

Western coral root is rare in subalpine forests in the Bitterroot Mountains. AK to CA, east to MT and WY.

Cypripedium L. Lady's Slipper

These orchids have stout, hairy stems, fleshy rhizomes, and large, prominently-veined, sheathing leaves. 1-few showy flowers are borne at the top of the stem and are subtended by a leaflike bract. Because the 2 lower sepals are united and the upper petals are sepal-like, the flower appears to be composed of 4 sepals and a large pouchlike lip petal. The upper sepal and petals are narrow and twisted. The column is held over the opening of the lip petal. The fruit is an elliptical capsule.

Lady's slippers are our showiest orchids. Both species are relatively scarce. They are rarely successful in gardens and should be left in their natural homes. Lady's slippers emit a peculiar odor that evokes a strong allergic reaction in some people.

1. Plants with usually 1 flower; slipper petal mostly yellow with purple spots near the opening.....(2) C. calceolus
1. Plants with mostly 2 flowers; slipper petals white without purple spots.....(1) C. montanum

1. Cypripedium montanum Dougl.

Mountain Lady's Slipper

This species has glandular-hairy stems, 20-45 cm (8-18 in) tall, and 4-6 broadly lance-shaped to elliptical leaves 5-10 cm (2-4 in) long. The 1-2 (rarely 3) flowers are each subtended by a sheathing, leaflike bract. The sepals and upper petals are dark purple to greenish-brown. The white slipper petal is 2-3 cm (1 in) long, often with purple veins. The column is yellowish-white with purple spots.

Mountain lady's slipper is widespread but locally rare, usually occurring as single plants or small colonies in dry to moist, open forests or shrublands of the foothills, occasionally up to the lower subalpine zone. It is usually found in depressions where humus has accumulated, but never in sites exposed to the wind. AK to CA, east to Alta., MT, and WY.

2. Cypripedium calceolus L.

Yellow Lady's Slipper

Yellow lady's slipper is vegetatively similar to but usually somewhat smaller than C. montanum. The stems are up to 35 cm (14 in) tall with 3-4 leaves. The 1-2 flowers have greenish-yellow to purplish-brown sepals and upper petals. The yellow slipper petal, 2-3 cm long, has purple spots around the opening. The column is also yellow with purple spots.

In our area, this rare species is known only from wet meadows along the Bitterroot River south of Lolo. B.C. to OR, east to e. Can., NY, MT, WY, and CO; Eurasia.

Goodyera R. Br. Rattlesnake Plantain or Orchid

Goodyera oblongifolia Raf.

Western Rattlesnake Plantain or Orchid

This perennial herb has glandular-hairy stems, 10-35 cm (4-14 in) tall, with several small, membranous bracts. The persistent, dark green, basal leaves have winged petioles and broadly lance-shaped blades,



h. *Zigadenus elegans* i. *Z. venenosus* j. *Calypso bulbosa* k. *Corallorhiza maculata* l. *C. mertensiana*
 m. *Corallorhiza striata* n. *C. trifida*

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3-6 cm (1-2 in) long, that are usually mottled with white along the midvein. Greenish-white flowers are borne in a narrow, 1-sided or spiraled spike up to 12 cm (5 in) long. The concave, nearly erect lip petal is prolonged into a spreading beak. The upper sepal is united with the upper petals to form a hood, 6-10 mm long, over the lip. The lateral sepals have spreading or reflexed tips. The fruit is a capsule about 1 cm long.

Our only evergreen orchid is common in open or deep forests from the valleys to the subalpine zones. AK to N.S., south to Mex., WI, and ME.

Rattlesnake plantain is our only orchid that is often common in mossy habitats.

Habenaria Willd. Bog Orchid, Rein Orchid

Members of this genus are glabrous herbs with leafy stems and fleshy, sometimes tuberous roots. The 1-2 basal leaves often wither as the plant matures. White or yellowish to greenish flowers, each subtended by a narrow bract, are borne in a terminal, narrow, spikelike inflorescence. The 2 upper petals and 2 lower sepals are similar and erect or spreading. The upper sepal is hoodlike, and the lower (lip) petal is prolonged at the base into a spur. The column is short.

Our species are placed in the genus Platanthera by some authorities. In addition to the following species, H. viridis (L.) R. Br., a circumboreal species with the lip petal lobed at the tip, is expected to occur in the Sapphire Range, although no verified specimens have been seen.

- | | | |
|----|---|----------------------------|
| 1. | Leaves mostly 1-4, confined to the lower 1/3 of the stem..... | 2 |
| 1. | Leaves several along most of the stem..... | 3 |
| 2. | Spur <6 mm long, ca. twice as long as the lip..... | (4) <u>H. unalascensis</u> |
| 2. | Spur >6 mm long, ca. as long as the lip..... | (5) <u>H. elegans</u> |
| 3. | Spur pouchlike, enlarged near the tip..... | (2) <u>H. saccata</u> |
| 3. | Spur more cylindrical, not enlarged at the tip..... | 4 |
| 4. | Flowers white, lip definitely widened at the base..... | (1) <u>H. dilatata</u> |
| 4. | Flowers greenish, lip only slightly widened at the base..... | (3) <u>H. hyperborea</u> |

1. Habenaria dilatata (Pursh) Hook.

White Bog Orchid

White bog orchid is up to at least 1 m (3 ft) tall with the largest leaves in the middle of the stem. The narrowly lance-shaped to elliptical leaves are 4-12 mm long with sheathing bases. The white or greenish flowers are pleasantly fragrant and borne in a congested, spikelike inflorescence. Sepals and petals are lance-shaped. The lateral sepals are spreading, while the upper sepal and petals form a hood over the column. The lip is 5-8 mm long, and the spur is half as long or longer.

Locally common in swamps, wet meadows, and other wet, open to partially shaded habitats of the foothills to the lower subalpine zone. This species is divided into a number of varieties based on the length of the spur. Most of our plants correspond to var. leucostachya (Lindl.) Ames. AK to CA, east to NY, PA, SD, and NM.

White bog orchid sometimes forms colonies in which the central plants are tallest, becoming progressively shorter outward.

2. Habenaria saccata Greene

Slender Bog Orchid

Slender bog orchid has fleshy, carrot-shaped roots and stems, 20-100 cm (8-40 in) tall, with 2-3 leafless sheaths near the base. The narrowly elliptical stem leaves, 3-10 cm (1-4 in) long, have blunt tips but become narrower towards the top of the plant. Lower flowers of the open inflorescence are subtended by narrow, leaflike bracts that become very reduced towards the top. The green or purplish-tinged, slightly fragrant flowers have the egg-shaped upper sepal and narrow upper petals forming a hood, while the lower sepals are spreading to reflexed. The narrowly oblong to elliptical lip, 5-7 mm long, has a short, pouchlike spur less than 2/3 as long as the lip.

Locally common in swamps, wet meadows, and other wet, open to partially shaded habitats of the foothills to the lower subalpine zone. AK to CA, east to Alta., WY, and NM.

3. Habenaria hyperborea (L.) R. Br.

Northern Bog Orchid

This glabrous species has stems up to 35 cm (14 in) tall. The lance-shaped leaves are up to 15 cm (6 in) long, but the blades of the lowest ones are small or lacking. The bracts subtending the green or yellow flowers are about 15 mm at the base of the inflorescence but less than 2 mm above. The elliptical to lance-shaped upper sepal and petals form a hood over the column. The spreading, lower sepals are distinctly nerved and sickle-shaped with recurved tips. The lip petal, 4-7 mm long, is lance-shaped with a straight to slightly curved spur about as long as the lip.

Infrequent in wet or boggy soil of meadows from the valleys to the subalpine zones. AK to Greenl. and Iceland, south to CA, NM, MN, and NY.

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4. *Habenaria unalascensis* (Spreng.) Wats.

Alaskan Rein Orchid

Alaskan rein orchid has leafless stems, 20-40 cm (8-16 in) tall, with narrow bracts above the base and 1-3 fleshy, egg-shaped roots 15-30 mm long. The 2-4 basal leaves have a sheathing base and a lance-shaped blade 6-12 cm (2-5 in) long. Numerous small, green to yellowish flowers are borne in a long dense to open spikelike inflorescence. The upper sepal and lip petal are egg-shaped and 2-4 mm long, while the upper petals and lower sepals are narrower and spreading. The cylindrical spur is curved and longer than the lip.

Widespread but locally uncommon in dry ponderosa pine and Douglas fir forests from the foothills up to 2025 m (6,500 ft). AK to Baja, Cal., east to Que., SD, and CO.

5. *Habenaria elegans* (Lindl.) Boland.

Elegant Rein Orchid

This species is similar to *H. unalascensis*, but the stems are taller, and the leaves are typically oblong. The flowers are slightly larger, and the curved spur, 8-18 mm long, is about twice as long as the lip petal.

Elegant rein orchid was observed in a forest opening at 1830 m (6,000 ft) in the Bitterroot Mountains southwest of Lolo. B.C. to CA, east to MT and ID.

Listera R. Br. Twayblade, *Listera*

These are small, slender, often rhizomatous perennials with 2 broad, prominently nerved leaves opposite each other in the middle of the stem. Small green or yellowish flowers are borne in a short, narrow, usually glandular-hairy inflorescence. The 3 sepals and 2 upper petals are similar and spreading or reflexed. The prominent lip petal projects down or outward.

These are our smallest orchids.

1. Lip petal deeply divided into 2 linear, pointed lobes.....(1) *L. cordata*
1. Lip petal nearly entire or with rounded lobes at the tip.....2
2. Tip of lip petal with two distinct, rounded lobes; rare.....(3) *L. convallarioides*
2. Tip of lip petal shallowly and irregularly notched; infrequent.....(2) *L. caurina*

1. *Listera cordata* (L.) R. Br.

Heartleaf Twayblade

Plants are 4-15 cm (1-6 in) tall with glabrous or minutely hairy foliage. The egg- to heart-shaped leaves are 1-4 cm long with a minute point at the tip. The 3-15 yellowish-green flowers, each subtended by a short bract, are borne at an ascending angle in a somewhat crowded inflorescence. The oblong to lance-shaped sepals and upper petals are spreading to reflexed, although the upper sepal is arched forward at the tip. The linear-oblong lip, 8-10 mm long, is deeply divided into 2 linear, spreading, pointed lobes.

Heartleaf twayblade is locally common in moist, partially shaded habitats, often with grasses and sedges, in the forests of the montane and subalpine zones up to 2135 m (7,000 ft). Circumboreal, south in w. North America to CA and NM.

2. *Listera caurina* Piper

Western Twayblade

Western twayblade has stems, 10-25 cm (4-10 in) tall, that are glandular-hairy above and glabrous below. The broadly lance-shaped to nearly round leaves are pointed at the tip and 3-6 cm (1-2 in) long. The green or yellowish flowers are subtended by conspicuous bracts. The sepals and upper petals are 1-nerved and spreading or slightly reflexed. The pear-shaped lip, 4-6 mm long, is rounded and shallowly notched at the tip.

Infrequent in moist, creek bottom forests in the Bitterroot Mountains, especially near the Selway Divide. It is most commonly associated with *Tiarella*. AK to CA, east to Alta. and MT.

3. *Listera convallarioides* (Sw.) Nutt.

Broad-lipped Twayblade

The broad-lipped twayblade is 10-20 cm (4-8 in) tall and has egg-shaped to nearly round leaves, 3-5 cm (1-2 in) long, with a pointed tip. The yellowish-green flowers, each subtended by a conspicuous bract, are borne in a glandular-hairy inflorescence. The linear to lance-shaped sepals and upper petals are 1-nerved and strongly reflexed back from the column and lip petal. The wedge-shaped lip, 8-10 mm long, is nearly horizontal with a contracted base and a conspicuously 2-lobed tip.

This rare orchid has been collected only once in the montane zone of the Rattlesnake Mountains. AK to Newf., south to CA, AZ, CO, MI, and NY; Asia.



s. *Habenaria hyperborea* t. *H. elegans* u. *H. saccata* v. *H. unalascensis*

Spiranthes L. C. Rich. Ladies' TressesSpiranthes romanzoffiana Cham. & Schlecht.

Ladies' Tresses

This orchid has stout, leafy stems, 8-20 cm (3-8 in) tall, and thick, fleshy roots. There are several narrowly lance-shaped leaves, 5-18 cm (2-7 in) long, on the lower stem, while the upper stem has greatly reduced, sheathing bracts. The numerous, white to cream-colored, sweet-scented flowers are twisted to the side and spirally arranged in the crowded, narrow, terminal inflorescence. The sepals and upper petals are similar and form a hood over the lip petal. The down-turned lip, 9-12 mm long, is constricted in the middle and widened to a rounded tip with upturned, notched margins. The capsule is ellipsoid.

Ladies' tresses is infrequent in bogs and wet meadows from the montane zone to near timberline. AK to Newf., south to CA, NM, IA, and NY; west coast of Ireland, Scotland and sw England.

POTAMOGETONACEAE Pondweed Family

Potamogeton L. Pondweed

These are perennial aquatic plants with extensive, slender rhizomes and simple or branched stems that often root at the nodes. The undivided leaves have membranous appendages at the base (stipules) that clasp the stem. Lower leaves are alternate, and the upper, often floating leaves are wider and may be opposite. Bisexual flowers are clustered in a spike that arises from the upper leaf axils and is often raised on its stalk above the surface of the water. The small, greenish flowers consist of 4 stamens fused to the 4 sepals and a single stigma on a short style. The fruit is a single seed surrounded by an outer coat (achene) that is usually keeled along one edge.

Although most pondweeds can be identified without flowers or fruits, submersed and floating leaves may be necessary for correct determination. Consequently young plants that lack floating leaves or old plants with disintegrating submersed leaves may be difficult to determine. C. L. Hitchcock (Hitchcock et al. 1969, Vascular Plants of the Pacific Northwest, Vol. 1) reports that hybridization is fairly common and many specimens may be intermediate between species.

1. Leaves all <5 mm wide.....2
1. Some leaves (at least the floating ones) >5 mm wide.....7
2. Leaves with at least 15 nerves.....3
2. Leaves with <10 nerves.....4
3. Stems cylindrical; leaves 2-ranked (borne in a single plane).....(12) P. robbinsii
3. Stems flattened and wing-margined; leaves not 2-ranked.....(14) P. zosteriformis
4. Leaves threadlike, nearly round in cross section, 1-nerved.....5
4. Leaves narrow but flat and more ribbonlike, 3-7 nerved.....6
5. Fruit with a small but definite beak; leaves usually with a sharp point at the tip...(7) P. pectinatus
5. Fruit without a definite beak; leaves blunt at the tip.....(8) P. filiformis
6. Stems with globose swellings on either side of the base of the leaves and stipules.(10) P. berchtoldii
6. Stems without globose swellings.....(9) P. foliosus
7. Submersed leaves mostly <2 mm wide and >10 cm (4 in) long.....(4) P. natans
7. Submersed leaves >2 mm wide or <10 cm long.....8
8. Leaves with bases that clasp the stem; floating leaves mostly lacking.....9
8. Leaves lacking clasping bases; floating leaves often present and different than the submersed ones..10
9. Membranous appendages at the base of the leaf (stipules) at least 3 cm (>1 in) long and persistent; stems often zig-zag.....(13) P. praelongus
9. Stipules 1-2 cm long, disintegrating as the plant matures; stems straight.....(11) P. richardsonii
10. Submersed leaves >2 cm wide, folded up along the midvein and sickle-shaped.....(5) P. amplifolius
10. Submersed leaves <2 cm wide, rarely folded or sickle-shaped.....11
11. Floating leaves generally reddish-tinged and not markedly different than submersed ones.(1) P. alpinus
11. Floating leaves not reddish, often markedly different than submersed ones.....12
12. Submersed leaves ribbonlike, 10-20 cm (4-8 in) long and 3-10 mm wide.....(6) P. epihydrus
12. Submersed leaves either wider or shorter.....13



w. *Listera caurina* x. *L. convallarioides* y. *L. cordata* z. *Spiranthes romanzoffiana*
a. *Potamogeton alpinus*

POTAMOGETONACEAE

13. Submersed leaves 3-10 mm wide; stipules <3 cm (1 in) long.....(2) P. gramineus
13. Submersed leaves 2-4 cm wide; stipules >3 cm long.....(3) P. illinoensis

Group I. Plants with both submersed and floating leaves.

1. Potamogeton alpinus Balbis

Northern Pondweed

Northern pondweed has slender, simple or sparsely branched stems up to 1 m (3 ft) long and reddish tinged foliage. Submersed leaves, 7-25 cm (3-10 in) long, are sessile and linear to lance-shaped with 7-9 nerves. Floating leaves are thin with a short petiole and narrowly lance-shaped blades with 9-13 nerves. The prominent stipules are very broad at the base. Flowers are crowded in spikes 15-30 mm long. The achene, 3-4 mm long, has a prominent keel and a curved beak.

Locally common in slow-moving to still, often shallow water of streams, ponds, and sloughs in the valleys. Circumboreal, south in North America to CA, CO, and PA.

2. Potamogeton gramineus L.

Grass-leaved Pondweed

Grass-leaved pondweed has highly branched, nearly cylindrical stems mostly 30-70 cm (12-28 in) long. Submersed leaves are narrowly lance-shaped or oblong and sessile with 5-7 nerves and persistent stipules up to 3 cm long. Floating leaves have long petioles and leathery, egg-shaped to elliptical blades with 13-17 nerves. Flowers are crowded on the spike with a stalk up to 25 mm long. The green achenes are 2-3 mm long with a short beak.

Locally common in shallow to fairly deep water of ponds, marshes and sloughs in the valleys. Circumboreal, including much of North America.

3. Potamogeton illinoensis Morong

Illinois Pondweed

A variable species, it has freely branching, cylindrical stems up to 2 m (6 ft) long. Submersed leaves, 5-20 cm (2-8 in) long, have short petioles with lance-shaped to broadly elliptical blades. Floating leaves (not always present) are similar but smaller with 13-30 nerves. The persistent sepals are 2-8 cm long and grooved on the bottom. Flower spikes, 2-7 cm long, are borne on stalks mostly 4-15 cm (2-6 in) long. The greenish fruit, 2-4 mm long, has a prominent keel and a short beak.

Illinois pondweed is locally common in deep water of lakes and sloughs in the valleys. Much of s. Can. and the U.S.

4. Potamogeton natans L.

Floating-leaved pondweed

This pondweed has nearly cylindrical, simple or branched stems about 2 mm thick and up to 1.5 m (5 ft) long. The submersed leaves disintegrate early. They are up to 30 cm (12 in) long with a long petiole and linear blade with 7-15 nerves. The numerous floating leaves have long petioles and elliptical to broadly lance-shaped blades, 5-10 cm long, with 20-35 distinct nerves. The achenes, up to 4 mm long with a 1 mm beak, are reddish or brown when mature.

Floating-leaved pondweed is locally common in ponds, lakes, and sloughs in the valleys. Circumboreal, AK to Newf., south to most of the U.S.; Europe.

5. Potamogeton amplifolius Tuckerman

Large-leaved Pondweed

A robust species with simple or short-branched stems up to 1 m (3 ft) long. Submersed leaves, 8-20 cm (3-8 in) long, have short petioles and lance-shaped to elliptical blades that are folded up along the midvein and curved like a sickle. Floating leaves have petioles up to 20 cm (8 in) long and leathery, egg-shaped to elliptical blades. Stipules are persistent and up to 15 cm (6 in) long. Flower spikes, 4-8 cm (1-3 in) long, are held above the surface of the water. The orange to brown achenes, 4-5 mm long, are keeled with a linear beak.

Large-leaved pondweed is found in fairly deep water of ponds, lakes, and sloughs in the valleys. B.C. to Newf. and south to much of the U.S.

6. Potamogeton epihydrus Raf.

Ribbon-leaf Pondweed

This species has flattened, simple or sparingly branched stems up to 2 m (6 ft) long. Submersed leaves are linear, up to 20 cm (8 in) long, and sessile with 5-7 nerves. Floating leaves have short, flattened petioles and elliptical blades that are leathery and 4-8 cm long with 15-25 nerves. Stipules are 1-3 cm long and blunt at the tip. Flower spikes are 2-4 cm long with stalks as thick as the stem. The green fruit is 3-4 mm long with a short beak and a distinct keel on the back.

Ribbon-leaf pondweed is locally common in ponds in the valleys. AK to Newf. and south to most of the U.S.



g. *Potamogeton gramineus* h. *P. illinoensis* i. *P. natans* j. *P. pectinatus*

POTAMOGETONACEAE

Group II. These species are entirely submersed.

7. Potamogeton pectinatus L.

Fennel-leaved Pondweed

This pondweed has a slender, densely branched, leafy stem 30-40 cm (12-16 in) long. The narrowly linear leaves are 10-12 cm (4-5 in) long and about 1 mm wide with a pointed tip. They are attached to the top of the sheathing stipule rather than directly to the stem. Flowers are borne in 2-5 distinct clusters on the spike that is 1-3 cm long. The egg-shaped achene is 3-5 mm long with a rounded keel and a short, curved beak.

Fennel-leaved pondweed is common in shallow water of ponds, ditches, and sloughs in the valleys. Circumboreal and in most of North America.

8. Potamogeton filiformis Pers.

Slender-leaved Pondweed

This plant has slender, densely branched stems that appear bushy and are usually less than 50 cm (20 in) long. Leaves are similar to those of P. pectinatus. Flowers are borne in a single or 2-5 separate clusters in a spike with a stalk up to 15 cm (6 in) long. The olive-green, egg-shaped achene, about 2 mm long, has a rounded keel and an indistinct beak.

Slender-leaved pondweed is locally common in shallow water of ponds and sloughs in the valleys. Nearly cosmopolitan, south in North America to CA, CO, MI, and PA.

This species is very similar to P. pectinatus and can only be distinguished by the beakless achenes.

9. Potamogeton foliosus Raf.

Close-leaved Pondweed

This species has slightly flattened and wing-margined stems, up to 1 m (3 ft) long, that usually lack swellings at the leaf nodes. The linear leaves have 3-5 nerves and are 1-3 mm wide and up to 10 cm (4 in) long. The membranous stipules sheath the stem, but disintegrate early. The cylindrical spike, about 5 mm long, is borne on a stalk up to 15 mm long. The green to yellowish achenes, about 2 mm long, have a wavy keel and a beak less than 0.5 mm long.

Close-leaved pondweed is locally common in shallow to moderately deep water in the valleys. Most of North America; Central America, West Indies, Hawaii.

10. Potamogeton berchtoldii Fieb.

Berchtold's Pondweed

[P. pusillus L. (in part)]

Berchtold's pondweed has slender, nearly cylindrical, highly branched stems, up to 1 m (3 ft) long, with globose swellings on either side of the leaf base. The linear leaves have 3 veins and are 6-7 cm (2-3 in) long and about 1 mm wide. Stipules are not attached to the leaf and disintegrate early. The globular to cylindrical spikes are borne on slender stalks 3-40 mm long. The green achenes, 2-3 mm long, have indistinct keels and short but prominent beaks.

Locally common in shallow ponds, sloughs, and backwater marshes in the valleys. AK to Newf., south to most of the U.S.

Some authorities now consider this species identical to P. pusillus L., a circumboreal species.

11. Potamogeton richardsonii (Bennett) Rydb.

Richardson's Pondweed

Richardson's pondweed has sparsely branched, cylindrical stems 1-2 mm wide and 30-60 cm (1-2 ft) long. The sessile, wavy-margined leaves, up to 10 cm (4 in) long, have 15-30 nerves and are lance-shaped with broad bases that clasp the stem. The distinctly nerved stipules, 1-2 cm long, shred into whitish fibers. Flowers are crowded on a spike, 15-40 mm long, with a sturdy stalk up to 20 cm (8 in) long. The greenish fruit, 2-4 mm long, has an inconspicuous keel and a beak 1 mm long.

Common in shallow to moderately deep water of ponds, lakes, and sloughs in the valleys. AK to Lab., south to CA, CO, IA, PA, and NY.

Because of the wavy-margined leaves, this species is sometimes mistaken for the introduced P. crispus, which is not known from our area.

12. Potamogeton robbinsii Oakes

Robbins' Pondweed

Robbins' pondweed has branched, cylindrical stems up to 70 cm (28 in) long and leaves that are crowded and tend to lie in a plane. The entire plant appears feathery and fernlike in the water. The stiff, narrowly lance-shaped leaves, up to 12 cm (5 in) long, have a broad midvein and are attached to the white, shredding stipules rather than directly to the stem. Plants are often sterile, and fertile plants have many spikes but few mature fruits. The achenes are about 4 mm long with a sharp keel and an inconspicuous beak.

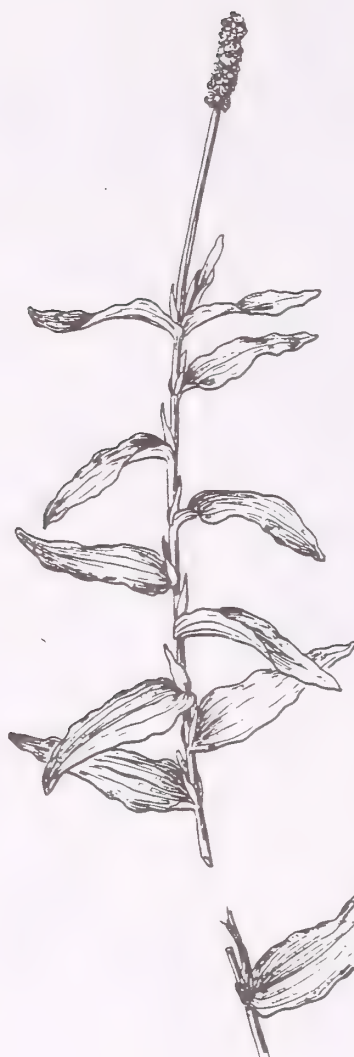
Uncommon in shallow to moderately deep water of lakes and ponds in the valleys. B.C. to Que., south to CA, WY, IN, and PA.



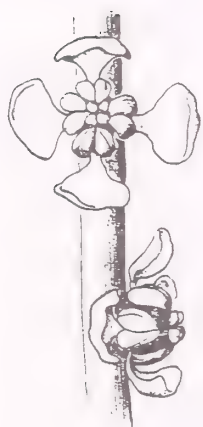
b. *Potamogeton amplifolius* d. *P. epihydrus* e. *P. filiformis* f. *P. foliosus*



a



b



c



a. *Potamogeton berchtoldii* b. *P. richardsonii* c. *P. robbinsii*



13. Potamogeton praelongus Wulf.

Long-stalked Pondweed

Long-stalked pondweed has slightly flattened, whitish to olive-green stems that zig-zag between the lower nodes. The rhizomes have rust-colored spots. The sessile, narrowly lance-shaped leaves, 10-35 cm (4-14 in) long, clasp the stem and have 3-5 strong nerves and a prow-shaped tip. The persistent stipules are white and 4-10 cm (1-4 in) long. The cylindrical flower spike, 2-5 cm (1-2 in) long, is borne on a stalk up to 40 cm (32 in) long. The dark green, egg-shaped achenes, 4-5 mm long, have a prominent keel and a short, stout beak.

Long-stalked pondweed is locally common in deep water of lakes and sloughs in the valleys. AK to Newf., south to CA, CO, IN, and NY; Europe.

14. Potamogeton zosteriformis Fern.

Eel-grass Pondweed

Eel-grass pondweed has strongly flattened and wing-margined stems 2-3 mm wide and up to 60 cm (2 ft) long. The sessile linear leaves are densely nerved, 2-5 mm wide, and up to 20 cm (8 in) long with a pointed tip. The whitish stipules, 1-4 cm long, disintegrate as the plant matures. Flowers are crowded in a cylindrical spike, 10-25 mm long, with a flattened stalk up to 10 cm (4 in) long. The oblong-elliptical achenes, about 4 mm long, have a sharp, wavy keel and a prominent, slightly curved beak.

This pondweed is locally common in moderately deep water of ponds, lakes, and sloughs in the valleys. Much of Can. and the U.S.

SCHEUCHZERIACEAE Scheuchzeria Family

Scheuchzeria L. ScheuchzeriaScheuchzeria palustris L.

Scheuchzeria

The rushlike plant has stems, 10-20 (4-8 in) tall, that are densely covered at the base with remains of old leaves. The alternate, linear leaves, 10-20 cm long, have broad bases that clasp the stem and membranous appendages on the inside at the base. The upper ones usually surpass the stem. The 3-12 stalked, greenish-white flowers are borne singly in the axils of leaflike bracts in an open, zig-zag inflorescence. The 3 sepals and 3 petals are similar, oblong, and about 3 mm long. There are 6 stamens and a single style. The fruit is an egg-shaped capsule, 5-8 mm long, with a short, curved beak.

Scheuchzeria is usually restricted to Sphagnum bogs and in our area is known only from a bog in the Rattlesnake Mountains. Circumboreal, south in North America to CA, MT, IA, and NJ.

SPARGANIACEAE Bur-reed Family

Sparganium L. Bur-reed

These are aquatic perennials with unbranched, erect or floating stems, and linear leaves that sheath the stem. Unisexual flowers are borne in dense, round clusters in the simple or branched inflorescence. The upper clusters (heads) have male flowers, while the lower are female. Male flowers have 3-5 stamens and as many small, membranous bracts, while females have bracts and a single style and ovary. The fruit is a nutlike, beaked achene.

1. Achene shaped like a cup-cake, abruptly narrowed to the beak; inflorescence usually branched.....(3) S. eurycarpum
1. Achene elliptic with a constricted middle, more peanut-shaped; inflorescence usually unbranched.....2
2. Leaves >6 mm wide; mature female heads 2-3 cm in diameter.....(1) S. emersum
2. Leaves <6 mm wide; mature female heads 1-2 cm in diameter.....(2) S. angustifolium

1. Sparganium emersum Rehmann

Simple-stem Bur-reed

[S. simplex Huds., S. multipedunculatum Rydb.]

Simple-stem bur-reed has slender, lax stems, 25-70 cm (10-28 in) tall, that float on the water or lie on the mud. The flat, ribbonlike leaves, 6-12 mm wide, are broadened at the base and as long or longer than the stems. The basal leaves are often Y-shaped in cross-section. The mostly unbranched inflorescence has 2-5 female heads, 2-3 cm wide when mature, and about as many smaller male heads. The elliptical achenes are about 10 mm long and slightly constricted in the middle with a slightly curved beak on top.

Uncommon in shallow water of marshes, ponds, and sloughs in the valleys. Circumboreal, south in North America to CA, CO, and ne. U.S.



d



e

var. simplex

d. *Scheuchzeria palustris* e. *Sparganium emersum*

2. Sparganium angustifolium Michx.

Narrow-leaved Bur-reed

The floating stems of this plant are 25-100 cm (10-40 in) long, shorter in shallow water. Leaves, 2-6 mm wide, are slightly rounded on the back and widened at the base. The unbranched inflorescence has 1-3 female heads, 1-2 cm wide when ripe, and 2-6 smaller male heads. The elliptical achene, 3-5 mm long, is constricted in the middle with a beak up to 2 mm long.

Narrow-leaved bur-reed is infrequent in shallow water of ponds, marshes and slow-moving streams in the valleys. Circumboreal, south in North America to CA, NM, and PA.

Some populations may contain large numbers of sterile plants.

3. Sparganium eurycarpum Engelm.

Broad-fruited bur-reed

This species has erect stems, 60-120 cm (2-4 ft) tall, that are mostly above water. The stiff leaves, 6-12 mm wide, are flat or slightly Y-shaped in cross-section. The branched inflorescence contains 1-4 female heads, 2-3 cm (about 1 in) in diameter, and 2-15 smaller male heads. The round to pear-shaped achenes, up to 10 mm long, are narrowed abruptly to the beak.

Broad-fruited bur-reed is infrequent in marshes and shallow water of ponds and sloughs in the valleys. Much of North America.

TYPHACEAE Cattail Family

Typha L. Cattail

Typha latifolia L.

Common Cattail

Cattail is a perennial herb with cylindrical, pith-filled stems up to 2 m (6 ft) tall from coarse rhizomes. The alternate, flat, linear leaves, 1-2 cm wide, sheath the stem. Unisexual flowers are borne on the terminal spike. The lower portion, 15-20 cm (6-8 in) long, bears the female flowers and is dark brown and 12-30 mm thick. The upper light brown, cone-shaped portion has male flowers and disintegrates after blooming. Male flowers are composed of 2-5 stamens and numerous slender hairs. Female flowers are similar with a single ovary and style. The elliptical seed is about 1 mm long with numerous hairs at the base.

Cattails are common in marshy areas around lakes, ponds and streams in the valleys. Most of North America; Eurasia, Africa.

The plant tends to form extensive pure stands. The starchy rhizomes are an important food for geese and muskrats.

ZANNICHELLIACEAE Horned Pondweed Family

Zannichellia L. Horned Pondweed

Zannichellia palustris L.

Horned Pondweed

Horned pondweed is a fully submersed, aquatic perennial with fragile, highly branched, slender stems from long, slender rhizomes. The opposite, threadlike leaves, 2-10 cm long, have membranous appendages (stipules) at the base that sheath the stem. Male flowers consisting of a single stamen and females consisting of 3-5 ovaries are borne together in the axils of the leaves. The fruit is a compressed and slightly keeled, sickle-shaped achene, 2-4 mm long, with a beak 1 mm long.

Locally common in quiet, often brackish water of ponds in the valleys. Nearly cosmopolitan.



k. *Potamogeton praelongus* l. *P. zosteriformis* m. *Sparganium angustifolium* n. *S. euricarpum*
o. *Typha latifolia* p. *Zannichellia palustris*

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Lackschewitz, Klaus. 1991. Vascular plants of west-central Montana—identification guidebook. Gen. Tech. Rep. INT-277. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 648 p.

This comprehensive guidebook provides keys, illustrations, and descriptions that aid identification of the 1,600+ species and varieties of vascular plants growing in west-central Montana. The area covered encompasses Ravalli County and southern Missoula County, and it includes the Bitterroot National Forest and portions of the Lolo National Forest. This guidebook uses a minimum of technical terminology and is intended for use by the public as well as by scientists, foresters, and educators. It may also serve as a model for compilation of similar information in other regions.

KEYWORDS: natural vegetation, introduced plants, Northern Rocky Mountains, flora, botany, taxonomy





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